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Vol. XXIX. JANUARY, 1903. No. 1.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

January 7th, 1903.—The meeting was called to order at 8.45 P. M., Henry B. Seaman, Director, in the chair; Charles Warren Hunt, Secretary; and present, also, 87 members and 14 guests.

The minutes of the meetings of December 3d and 17th, 1902, were approved as printed in the *Proceedings* for December, 1902.

The discussion on the topic "The Sanitary Disposal of Municipal Refuse" was continued by Messrs. George A. Soper, Theodore Horton, W. J. Baldwin, Charles B. Ball, M. N. Baker, H. de B. Parsons and Rudolph Hering.

Ballots were canvassed and the following candidates declared elected:

As Members.

Thomas Hooker Loomis, Steubenville, Ohio.
William Martin, Bellevue, Pa.
John Colwell Neale, Pittsburg, Pa.

As Associate Members.

Lewis Eugene Ashbaugh, Ames, Iowa.
William Durward Connor, New London, Conn.
William Hastings Ferguson, Denver, Colo.
George Sherman Frost, New York City.
Charles Romney Hall, Portland, Me.
Austin Curtin Harper, Norfolk, Va.
Frederick William Schwiers, New York City.
John Eaton Shepardson, New York City.
Samuel Payson Waldron, East Berlin, Conn.
Ralph Norman Wheeler, New York City.

The Secretary announced the election of the following candidates by the Board of Direction on January 6th, 1903.

As Juniors.

Richard Erwin Dougherty, New York City.
William Dollison Faucette, Savannah, Ga.
Max Feldman, New York City.
Langdon Pearse, Roxbury, Mass.
William Edward Wilson, Detroit, Mich.

Adjourned.

January 21st, 1903.—The minutes of this, the Annual Meeting, will be printed in the *Proceedings* for February, 1903.

OF THE BOARD OF DIRECTION.

(Abstract.)

January 6th, 1903.—8.35 p. m.—Director O'Rourke in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Briggs, Croes, Jackson, Knap, Pegram, Seaman and Wilgus.

The cases of members in arrears for dues were considered and acted upon.

Upon the recommendation of the Finance Committee, it was decided to pay Ten Thousand Dollars on January 15th, 1903, on account of the principal of the mortgage held by the Mutual Life Insurance Company on the Society House.

A draft of the report to the Board of Direction was presented, by the Special Committee appointed for that purpose, and adopted.

The report of the Committee to recommend the award of prizes for the year ending with the *Transactions*, July, 1902, was received, and the prizes awarded, in accordance with the recommendations of that report, as follows:

The Norman Medal to Paper No. 911, "Experiments at Detroit, Michigan, on the Effect of Curvature upon the Flow of Water in Pipes" by Gardner S. Williams, M. Am. Soc. C. E., Clarence W. Hubbell, Assoc. M. Am. Soc. C. E., and George H. Fenkell, Jun. Am. Soc. C. E.

The Thomas Fitch Rowland Prize to Paper No. 910, "Description of Coos Bay, Oregon, and the Improvement of Its Entrance by the Government," by William W. Harts, M. Am. Soc. C. E.

The following resignations were accepted: S. E. B[illegible]ney, Assoc. M., Frederic V. Pitney, Assoc. M., Henry H. Shepard, Assoc. M., R. C. McKinney, Assoc., Mark Fargusson, Jun., Myron H. Lewis, Jun., George E. Nostrand, Jun., George R. Wadsworth, Jun.

Applications were considered and other routine business transacted.

Five candidates for Junior were elected.*

Adjourned.

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* See page 2.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, February 4th, 1903.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and there will be an informal discussion on "The Preservation of Materials of Construction." It is not intended to confine this discussion to any particular material or method, but to invite exchange of opinion, based on experience, of practical methods of securing permanence in engineering structures of all types. Several members have already agreed to take part, and it is hoped that others will come prepared to speak, or will send written communications on the subject.

Wednesday, February 18th, 1903.—8.30 P. M.—At this meeting a paper by George S. Morison, Past-President, Am. Soc. C. E., entitled "The Panama Canal," will be presented for discussion. This paper is printed in this number of *Proceedings*.

Wednesday, March 4th, 1903.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper by M. H. Gerry, Jr., Assoc. M. Am. Soc. C. E., entitled "A High-Voltage Power Transmission," will be presented for discussion. This paper is printed in this number of *Proceedings*.

ANNUAL CONVENTION OF 1903.

The Thirty-fifth Annual Convention of the Society will be held at Asheville, N. C., during the week beginning June 8th, 1903.

ANNUAL REPORT OF THE BOARD OF DIRECTION FOR THE YEAR ENDING DECEMBER 31st, 1902.

PRESENTED AT THE ANNUAL MEETING, JANUARY 21st, 1903.

The Board of Direction, in compliance with the Constitution of the Society, presents its report for the year ending December 31st, 1902.

MEMBERSHIP.

The changes in membership are shown in the following table:

Grade.	Jan. 1st, 1902.			Jan. 1st, 1903.			Losses.				Additions.		Totals.	
	Resident.	Non-Resident.	Total.	Resident.	Non-Resident.	Total.	Transfer.	Resignation.	Dropped.	Death.	Transfer.	Election.	Loss.	Gain.
Honorary Members.........	1	9	10	1	8	9	..	..	..	1	....	....	1	....
Corresponding Members....	....	2	2	....	2	2	..	..	..	..	....	....	....	....
Members..................	286	1 222	1 508	312	1 263	1 575	..	1	2	24	*28	§66	27	94
Associate Members..........	161	451	612	192	522	714	25	5	2	3	†35	‖102	35	137
Associates..................	38	73	111	43	76	119	2	1	..	3	‡2	12	6	14
Juniors.....................	101	150	251	107	154	261	38	6	14	..	....	68	58	68
Fellows.....................	9	25	34	10	23	33	..	..	..	1	....	....	1	....
Totals..................	596	1 932	2 528	665	2 048	2 713	65	13	18	32	65	248	128	313

* 25 Associate Members and 3 Juniors.
† 2 Associates and 33 Juniors.
‡ 2 Juniors.
§ 1 Reinstatement.
‖ 1 Reinstatement.

It will be seen that the net increase during the year was 185.

In the report of the Board for 1902, statistics of the yearly growth of the Society for thirty-two years were given, and it was pointed out that the rate of increase for the last few years was apparently not due to temporary conditions. The result of this year seems to emphasize this, the figures of the increase for the past four years being as follows:

1899—Net increase in total membership............	103
1900 " " " " "	138
1901 " " " " "	191
1902 " " " " "	185
Total for the past four years.......................	617
Average yearly increase for the past four years.....	154
Average yearly increase from 1869 to 1898, inclusive.	62

The total number of applications received during the year was 362.

Action taken by the Board has been as follows:

Passed to ballot as Members	109
Passed to ballot as Associate Members	140
Elected Associates	14
Elected Juniors	65
Total	328
Applications awaiting action	90

The losses by death reported during the year number 32. They are as follows:

Honorary Member: William Hasell Wilson.

Members: Edward Josiah Blake, Charles Edward Henry Campbell, Lorenzo Russell Clapp, Emilio Del Monte, William Durfee Gelette, Edmund Phillips Hannaford, Charles Fletcher Hillman, Arthur Stanley Hobby, Milton Grosvenor Howe, John Butler Johnson, Moritz Lassig, Charles Hazlehurst Latrobe, William Shattuck Lincoln, George Henry Mendell, James Ellison Mills, Henry Mitchell, Nathaniel Edwards Russell, Ira Alexander Shaler, Martinius Stixrud, Robert Henry Temple, William Van Slooten, Robert Atwell Way, Oscar F. Whitford, Joseph Miller Wilson.

Associate Members: Henry Lawrence Cleverdon, Reginald McKean, Kenneth Oake Plummer Reinholdt.

Associates: John Woodbridge Davis, Charles Edward Hamlin, Peter Milne.

Fellow: Nathaniel Cheney.

LIBRARY.

The accessions to the Library during the year are shown in the following table:

Accessions During the Year 1902.

	Bound Volumes.	Unbound Volumes.	Specifications.	Maps, Photographs and Drawings.	Total.
Donations—					
In answer to special requests	272	1 153	....	1	1 426
From publishers	47	14	....	...	61
Eng. News Pub. Co.	24	148	25	...	197
In regular course	214	1 047	3 070	306	4 637
Exchange of duplicates	322	368	....	...	690
By purchase	237	238	....	...	475
Total	1 116	2 968	3 095	307	7 486

In addition to the above, there have been received 489 duplicates, and 234 separate numbers to complete files of periodicals, neither of which can appear as accessions.

A comparison with the corresponding figures for last year shows that the growth of the Library in 1902 has exceeded that of 1901 (which was regarded as phenomenal) by 1 459 accessions.

The Library now contains:

Bound volumes	11 330
Unbound volumes	27 609
Specifications	5 658
Maps, photographs and drawings	3 000
Total	47 597

The total number of titles in the Library is 19 178.

During the year, 890 volumes have been bound, and 55 bound volumes which were duplicates were received and have replaced previously unbound volumes.

The following amounts have been expended upon the Library during the year:

Purchase of books, 475 volumes	$1 224.87
Express charges, etc	99.90
Binding 890 volumes	931.25
Fixtures and supplies	207.29
Total	$2 463.31

The value of the accessions to the Library during the year is as follows, each accession having been valued separately, as received:

7 011 Donations and exchanges (estimated value)	$2 822.41
475 Volumes purchased (cost)	1 224.87
Binding 890 volumes	931.25
	$4 978.53

Owing to the rapid increase of the Library, and the accession of many new books, by purchase and otherwise, it has been decided to publish a second volume of the classified Catalogue, the first volume of which was published in 1900. This volume is now nearly all in type, and it is expected will be issued to all members in about a month.

For the first 45 years of the life of the Society the total number of accessions to the Library was 30 847, an average yearly addition of 685 volumes. About the close of 1897 the Library was moved into the new House. Since that time the average yearly addition has been 3 350 volumes, the total, as stated above, being now 47 597.

By the terms of the will of the late Herbert Steward, Assoc. Am. Soc. C. E. (who died March 4th, 1899), the Society has received, during the year, $1 940, and the Board has accepted this bequest under the terms of Mr. Steward's will, which were as follows:

> "I give and bequeath to the American Society of Civil Engineers the sum of two thousand dollars, to be known as the Herbert Steward Library Fund. The fund shall be invested and utilized as the Board of Direction of said Society may elect, provided it shall secure a yearly income; which income shall be entirely expended each year for the purchase of books, maps, or apparatus suitable for the Library of said Society, or for the purpose of promulgating engineering information. I also give to said Society such technical books from my library as may be selected by the Secretary of the Society."

A gift of £10 was also received during the year from *Sir* Benjamin Baker, Hon. M. Am. Soc. C. E., for library purposes.

PUBLICATIONS.

During the year the usual ten numbers of *Proceedings* have appeared, and three volumes of *Transactions*, instead of the usual two, have been published.

In the *Proceedings*, the list of references to current engineering literature has covered 51 pages, containing 2 614 classified references to 62 periodicals.

The demand for publications has been much greater than usual, subscriptions and sales during the year amounting to $3 231.16.

The stock of the various publications of the Society, kept on hand for the convenience of members and others, now amounts to 119 850 copies, the actual cost of which to the Society has been $13 904.42.

More than 3 200 volumes of *Transactions* have been bound, during the year, for members and others, in the standard half-morocco or cloth bindings.

Summary of Publications for 1902.

	Number Issued.	Total Edition of Each.	Number of Pages.	Plates.	Cuts.
*Transactions**	3	2 800 2 900 3 100	1 434	52	327
*Proceedings**	10	3 000	1 266	40	141
Constitution and List of Members	1	3 200	237	....	....
Advertisements	10	3 000	108	....	....
Totals	....	......	3 045	92	468

* Includes Indexes and Tables of Contents.

The cost of publications has been:

For Paper, Printing, Binding, etc., *Transactions* and *Proceedings*		$8 211.14
For Plates and Cuts		957.56
For Boxes, Mailing Lists, Copyright and Sundry Expenses		231.50
For Commission on Advertisements		265.09
For 6 575 copies of Memoirs and Papers		734.61
For List of Members		909.33
Total		$11 309.23
Deduct amount received for advertisements	$1 807.50	
Deduct amount received for sale of publications	3 231.76	
		5 039.26
Net cost of Publications for 1902		$6 269.97

Since publications were begun by the Society, 31 years ago, there have been published 49 volumes of *Transactions*, 28 volumes of *Proceedings* and 33 miscellaneous separate publications, consisting of Indexes, Catalogues, Lists of Members, etc. The total number of pages in these publications has been 42 099, an average yearly output of 1 358 pages.

Beginning with 1896, the system of publication was changed, and since that time *Proceedings* and *Transactions* have been issued separately.

For the 24 years, 1872–1895 (inclusive), there were issued 22 799 pages, a yearly average of 950 pages, and for the past 7 years the total issue has been 19 300 pages, an average of 2 757 pages per year.

MEETINGS.

During the year 25 meetings have been held, as follows: At the Annual Meeting, 2; at the Annual Convention, 6; regular semi-monthly meetings, 17.

At these meetings there were presented 18 formal papers, 4 of which were illustrated with lantern slides; 7 topics for informal discussion, one of which was illustrated with lantern slides; and 8 illustrated lectures.

The Thirty-fourth Annual Convention was held at the Willard Hotel, Washington, D. C. There were registered at this Convention 343 members of the Society, in all grades, accompanied by 377 members of their families, and other guests. This was the most largely attended Convention of the Society ever held.

MEDALS AND PRIZES.

For the year ending with the month of July, 1901, Prizes were awarded, as follows:

The Thomas Fitch Rowland Prize, to L. G. Montony, Assoc. M. Am. Soc. C. E., for his paper entitled "The Ninety-Sixth Street Power Station of the Metropolitan Street Railway Company, of New York City."

The Collingwood Prize for Juniors, to F. A. Kummer, Jun. Am. Soc. C. E., for his paper entitled "A Proposed Method for the Preservation of Timber."

No award of the Normal Medal was made.

FINANCES.

An examination of the Secretary's statement of receipts and disbursements, and of the general balance sheet which accompanies it, will show the financial condition of the Society. During the year the sum of $1 940 has been received from the Executors of the estate of the late Herbert Steward, Assoc. Am. Soc. C. E., this sum to be invested and the yearly proceeds to be used in the purchase of books, maps, or apparatus suitable for the library, or for the purpose of promulgating engineering information.

When, in 1895, the project for building a new house was under consideration, the total assets of the Society (omitting the estimated value of the Library, and of publications in stock) were about $65 000. Making no allowance for increase in the value of the present property since it was purchased, the total assets now are about $167 000.

In the report of the Board for the year 1898, it is stated that "the permanent loan has been fixed at $85 000, which loan has been secured at a rate of 4½ per cent." The payment, on January 15th, 1903, of $10 000 on the principal of the mortgage, which has been authorized by the Board, will reduce the debt to $55 000, which is now carried at 4% interest. In other words, $30 000 has been paid off in four years.

The reports of the Secretary and the Treasurer are appended.

By order of the Board of Direction,

CHAS. WARREN HUNT,
Secretary.

New York, January 6th, 1903.

GENERAL BALANCE SHEET, DECEMBER 31st, 1902.

Accompanying Report of the Secretary.

Assets.			Liabilities.	
Building and Lot (cost)		$191 730.26	Dues for 1903, paid in advance	$12 127.23
Furniture (cost)		15 664.30	Mortgage Debt	65 000.00
Publications on hand; inventoried value		13 904.42	Funds invested in Society House and Lot, and Library	223 150.82
Library:				
Cash expended for Books, etc.	$7 824.88			
Estimated Value of Donations	40 600.73	48 425.61		
Due from Members	$3 456.26			
" " Non-Members, for Publications	244.81			
" for Advertising	555.00			
		4 256.07		
Cash		26 297 39		
		$300 278.05		$300 278.05

New York, 19th January, 1903.—We have examined the books and accounts of the American Society of Civil Engineers, and certify that the foregoing Balance Sheet is in accordance therewith, as of 31st December, 1902; and, in our opinion, correctly states the condition of the Society's affairs as shewn by the books at that date.

Menzies, Robertson & Co.,
Chartered Accountants.

REPORT OF THE SECRETARY, FOR THE

To the Board of Direction of the

Gentlemen,—I have the honor to present a statement of Re-
December 31st, 1902. There is also presented a general balance sheet
New York, January 6th, 1903.

Receipts.

Balance on hand December 31st, 1902, in Bank and Trust Company and in hands of the Treasurer		$15 993.31
Entrance Fees	$6 025.00	
Current Dues	30 786.47	
Past Dues	1 256.88	
Advance dues	12 127.23	
Certificates of Membership	197.47	
Badges	1 213.00	
Sales of Publications	3 231.76	
Advertisements	1 807.50	
Interest	307.35	
Compounding Dues	250.00	
Library	50.75	
Annual Meeting	223.00	
Binding	2 896.87	
Miscellaneous	156.57	
Herbert Steward Library Fund	1 940.00	
Caretaking	28.00	
		62 497.85
		$78 491.16

YEAR ENDING DECEMBER 31st, 1902.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

ceipts and Disbursements for the fiscal year of the Society, ending
showing the condition of the affairs of the Society.

Respectfully submitted,

CHAS. WARREN HUNT,

Secretary.

DISBURSEMENTS.

Salaries of Officers	$8 199.97	
Clerical Help	8 759.34	
Caretaking	1 852.23	
Publications	11 044.14	
Postage	3 354.08	
General Printing and Stationery	1 747.84	
Badges	975.20	
Certificates of Membership	117.80	
Binding	2 033.11	
Library	2 459.56	
Maintenance of House	334.71	
Heat, Light and Water	1 068.79	
Betterments	29.48	
Furniture	360.34	
Annual Meeting	785.30	
Convention	434.50	
Prizes	111.00	
Advertising Commission	265.09	
Interest and Insurance	2 700.00	
Petty Expenses	182.29	
Society House Loan	5 000.00	
Current Business	357.95	
Refunds	21.05	
		$52 193.77
Balance on Hand December 31st, 1902:		
In Union Trust Company	$24 562.41	
In Garfield National Bank	749 98	
In hands of Treasurer	985.00	
		26 297.39
		$78 491.16

REPORT OF THE TREASURER.

In compliance with the provision of the Constitution, the Treasurer presents the following report for the year ending December 31st, 1902:

Balance on hand December 31st, 1901			$15 993.31
Receipts from current sources, January 1st to December 31st, 1902		$60 509.35	
Received from Herbert Steward Library Fund		1 940.00	
Received from Sir Benjamin Baker		48.50	
			62 497.85
Payment on audited vouchers for current business, January 1st to December 31st, 1902		$47 193.77	
Payment on principal of Bond and Mortgage		5 000.00	
Balance on hand December 31st, 1902:			
In Union Trust Company	$24 562.41		
In Garfield National Bank	749.98		
In hands of the Treasurer	985.00	26 297.39	
		$78 491.16	$78 491.16

Respectfully submitted,

JOSEPH M. KNAP,

Treasurer, Am. Soc. C. E.

NEW YORK, January 6th, 1903.

ACCESSIONS TO THE LIBRARY.

From December 10th, 1902, to January 13th, 1903.

DONATIONS.*

THE CIVIL ENGINEER'S POCKET-BOOK.

By John C. Trautwine. Revised by John C. Trautwine, Jr., and John C. Trautwine, 3d. Eighteenth Edition, Morocco, 7 x 4 ins., 1 079 pp., illus. New York, John Wiley & Sons, 1902. $5.00. (Donated by John C. Trautwine, Jr., and John C. Trautwine, 3d.)

The preface states that in preparation for the eighteenth edition, this book, the first edition of which appeared thirty years ago, has undergone a far more extensive revision than at any other time. More than 870 pages of new matter have been added, and the new edition is larger, by about 100 pages, than its recent predecessors. The articles on arithmetic are considerably extended by the addition of new matter relating to interest, annuities, depreciation, etc. The conversion tables contain the equivalents of both English and metric units, and each of these in terms of the other. The new article on the location of the meridian is much more complete than its predecessors, and a new table of azimuths of Polaris, corresponding to different hour-angles, has been added. Among the important changes in this edition are those in the articles on Statics, on Beams, and on Trusses. These have been almost entirely rewritten and completely modernized. Under Trusses, modern methods of construction are explained, and several modern roofs and bridges are described and illustrated. The Contents are: Mathematics; Natural Phenomena: Mechanics; Force in Rigid Bodies; Strength of Materials; Hydrostatics; Hydraulics; Constructions, etc.; Water Supply; Test and Well Boring; Rock Drills; Traction, Animal Power; Trusses; Suspension Bridges; Rivets and Riveting; Railroads; Materials. There is an index of forty-one pages.

ANCIENT AND MODERN ENGINEERING AND THE ISTHMIAN CANAL.

By William H. Burr, M. Am. Soc. C. E., M. Inst. C. E. Cloth, 9 x 6 ins., 15 + 473 pp., illus. New York, John Wiley & Sons, 1902. $3.50. Postage or Express, 27 cents additional.

This book is the outcome of a course of six lectures delivered at the Cooper Union in the City of New York, in February and March, 1902, under the auspices of Columbia University. These lectures have been expanded for the purposes of publication. The half-tone illustrations, with scarcely an exception, have been prepared from photographs of the actual subjects illustrated. All such illustrations in Parts V and VI, devoted to the Nicaragua and Panama Canal Routes, are made from photographs at the various locations by members of the force of the Isthmian Canal Commission. The parts are: Ancient Civil Engineering Works; Bridges; Water-Works for Cities and Towns; Some Features of Railroad Engineering; The Nicaragua Route for a Ship-Canal; The Panama Route for a Ship-Canal.

A TREATISE ON ROADS AND PAVEMENTS.

By Ira Osborn Baker, M. Am. Soc. C. E. Cloth, 9 x 6 ins., 8 + 655 pp., illus. New York, John Wiley & Sons, 1903. $5.00.

The author states in the preface that the object of this book is to give a discussion, from the point of view of an engineer, of the principles involved in the construction of country roads and city pavements. The attempt has been made to show that the science of road making and maintenance is based upon well-established elementary principles, and that the art depends upon correct reasoning from the principles rather than in attempting to follow rules or methods of construction. In some cases practical experience has not yet determined the best method of procedure, and in these cases the conflicting views with the reasons for each are fully stated. Considerable space has been given to the economics and location of country roads and to the construction and maintenance of earth roads. The remainder of the book, the portion that considers roads having permanently hard surfaces, is based chiefly upon American experience. The Contents are: Part I. Country Roads. Road Economics; Road Location; Earth Roads; Gravel Roads; Broken-Stone Roads; Miscellaneous Roads; Equestrian Roads and Horse-Race Roads. Part II. Street Pavements. Pavement Economics; Street Design; Street Drainage; Curbs and Gutters; Pavement Foundations; Asphalt Pavements; Brick Pavements; Cobble-Stone Pavement; Stone-Block Pavement; Wood-Block Pavements; Comparison of Pavements; Sidewalks; Bicycle Paths and Race Tracks. There is an index of nine pages.

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* Unless otherwise specified, books in this list have been donated to the Library by the Publisher.

POWER DISTRIBUTION FOR ELECTRIC RAILROADS.

By Louis Bell. Third Edition, Revised and Enlarged. Cloth, 9 x 6 ins., 7 + 303 pp., illus. New York, Street Railway Publishing Company, 1900. $2.50.

The preface states that this book is written in the hope that it may be of service to those whose daily work is concerned with the art of transportation, in which electrical traction is to-day so potent a factor. The author has endeavored to set forth the general principles of the distribution of electrical energy to moving motors, to describe the methods which experience has shown to be desirable in such work, and to point out the ways in which these principles and methods can be co-ordinated in every-day practice. For the most part, apparatus is too mutable to describe exhaustively, unless one is writing a history. The reader will therefore find little of such detail. The volume deals with principles and methods, and, consequently, the examples given in the first edition are, save in unimportant details, as typical of current practice in 1900 as they were in 1896. The chapter headings are: Fundamental Principles; The Return Circuit; Direct Feeding Systems; Special Methods of Distribution; Substations; Transmission of Power for Substations; Alternating Motors for Railway Work; Interurban and Cross Country Work; Fast and Heavy Railway Service.

COMBUSTIBLES INDUSTRIELS.

Houille, Pétrole, Lignite, Tourbe, Bois, Charbon de Bois, Agglomérés, Coke. Par Felix Colomer et Charles Lordier. Paper, 10 x 6½ ins., 565 pp., illus. Paris, Vve. Ch. Dunod, 1903. 19 fr. 50.

For each of the above named fuels, one will find in this work information on its physical and chemical properties, its method of preparation, its use in the various furnaces for stationary boilers, locomotives or ships, its conditions of purchase, etc. The Contents are: Houille—Définition et classification de la houille; Essais et analyse de la houille; Sortage de la houille; Lavage de la houille; Définition industrielle et achat de la houille; Emploi de la houille dans les foyers; Foyers spéciaux; Pétrole—Propriétés et analyse du pétrole; Emplois du pétrole; Brûleurs à pétrole; Lignite, Tourbe, Bois, Charbon de Bois; Agglomérés—Généralités sur les agglomérés; Outillage des usines à agglomérés; Appareils de compression; Coke—Définition et emploi du coke; Théorie de la carbonisation; Fours à coke; Récupération des sous-produits; Installation et prix de revient d'une usine de carbonisation. There is an index of thirty-five pages.

A TEXT-BOOK ON FIELD ASTRONOMY FOR ENGINEERS.

By George C. Comstock. Cloth, 9 x 6 ins., 10 + 202 pp., illus. New York, John Wiley & Son, 1902. $2.50.

The author states in the preface that the present work is not designed for professional students of astronomy, but for another and larger class, found in technical colleges. For many years it has been the author's duty to teach to students of engineering the elements of practical astronomy, and the experience thus acquired has gradually produced the unconventional views that find expression in the present text, and which, to the author's mind, are justified by the following considerations: In the engineering curriculum, work in astronomy is a part of the technical and professional training of students who have no purpose to become astronomers. Under these circumstances it seems to be the duty of the instructor to select for presentation those parts of astronomical practice most closely related to the work of the future engineer, and, with reference to the narrow limits of time allotted the subject, to keep in the background many collateral matters that are of primary interest and importance to the student of astronomy as a science. The chapter headings are: Introductory; Co-ordinates; Time; Corrections of Co-ordinates; Rough Determinations; Approximate Determinations; Instruments; Accurate Determinations; The Transit Instrument; Bibliography; Orientation Tables. There is an index of two pages.

METALLURGICAL LABORATORY NOTES.

By Henry M. Howe. Cloth, 9 x 6 ins., 14 + 140 pp., illus. Boston Testing Laboratories, Boston, 1902. $2.50.

The preface states that metallurgical laboratory instruction of the established type reproduces the industrial metallurgical processes, each as a whole, and with such fidelity to actual industrial practice as is attainable. This, which may be called "Applied Metallurgy," seems to the author to have inherent and very grave faults. In its place he has tried to work out a system of what may be called "Theoretical," or better, "Analytical Metallurgy," with the aim of teaching, not individual processes each as a whole, but the individual underlying principles each by itself. This he has tried to do by means of a series of distinct experiments, each testing directly one or more of these principles. With a few exceptions, all the experiments in this work have been carried out either in the metallurgical laboratory of the School of Mines of Columbia University, or earlier in the author's private laboratory, and either exactly in the form here given, or in a form of which the present is a slight modification. The tables at the end of the work are original here, except that of atomic weights, and also, except in a sense, that of melting points of silicates. The book is divided into the following groups: Squad Experiments and Others for a Short Course in Metallurgy; Pyrometry and Calorimetry; Melting Points of Silicates, etc.; Properties of Refractory Materials; Iron and Steel; Non-Ferrous Metals. There is an index of ten pages.

THE PHYSICAL GEOGRAPHY OF NEW YORK STATE.

By Ralph S. Tarr. (With a Chapter on Climate by E. T. Turner.) Cloth, 9 x 6 ins., 13 + 397 pp., illus. New York, The Macmillan Company, 1902. $3.50 net.

It is stated in the preface that at the request of the American Geographical Society in 1896 a series of articles on the Physical Geography of New York State was undertaken and the first number appeared in the Bulletin of the American Geographical Society, Vol. XXVIII, 1896. When these articles were begun, it was the author's intention to cover the subject in two or three numbers; but, after getting well into the task, it became evident that to cover the field with any fulness would require many more chapters than were originally planned, and, therefore, the series lengthened out to twelve numbers and was not finished until 1900. In the main, this book is a reprint of the articles as published in the Bulletin, but there has necessarily been a certain amount of revision, and many of the more important papers on the subject which have appeared since the original publication of the articles have been made use of, so that the bibliography has been brought down to date. The chapter headings are: General Physical Features; The Mountains of the State; Plains and Plateaus; The Influence of the Glacial Period upon Topography; The Rivers of New York; Lakes and Swamps; Origin of the Basins of the Great Lakes; Post-Glacial History of the Great Lakes; Niagara; The Shore Lines; The Climate of New York; Influence of Physiographic Features upon the Industrial Development of the State. There is an index of eight pages.

EXPÉRIENCES SUR LE TRAVAIL DES MACHINES-OUTILS.

Pour les Métaux. Par C. Codron. Paper, 11 x 9 ins., 2 + 267 pp., illus. Paris, Vve. Ch. Dunod, 1902. 12 fr. 50.

The preface states that while continuing the publication of the study on the work of machine-tools in the *Bulletin de la Société d'Encouragement pour l'Industrie Nationale*, the author has thought that it would be advantageous to bring out the first part for the public who are interested in mechanical arts. The Contents are: Meulage; Essais de meulage; Essais à vitesse variable; Tranchage; Tranchage du plomb, du cuivre, du fer, de l'acier; Emploi de deux tranches opposées; Coupe avec deux molettes; Essais de pénétration d'une molette; Coupe des tubes; Cisaillage; Essais de cisaillage à lames parellèles; Cisaillage avec lames obliques; Essais de cisaillage avec lames circulaires; Essais de cisailleuse; Essais de cisaillage à vitesse variable; Poinçonnage; Formes des débouchures; Essais divers de poinçonnage: Poinçons aléseurs à tranchants multiples; Alésage de trous à la broche; Poinçonnage progressif; Essais de poinçonneuse; Essais de poinçonnage multiple; Poinçonnage sur épaisseurs multiples.

Gifts have also been received from the following:

Allentown, Pa.—Water Commrs. 1 pam.
Am. Inst. of Min. Engrs. 1 bound vol., 1 pam.
Am. Iron & Steel Assoc. 1 pam.
Assoc. des Ingénieurs Sortis des Écoles Spéciales de Gand. 1 pam.
Berg, Walter G. 1 vol.
Betts, E. E. 1 pam.
Cal. Acad. of Sci. 1 vol.
City Record. 8 bound vol.
Duluth, Minn.—Board of Public Works. 1 vol.
Ehrlich, F. 1 pam.
Fletcher, Robert. 1 vol., 22 pam.
Fritch, L. C. 3 pam.
Gotshall, W. C. 2 pam.
Great Britain—Patent Office. 1 vol., 5 pam.
Hammond Bequest. 112 bound vol., 9 pam.
India—Director of Ry. Construction. 8 pam.
Indian Midland Ry. Co., Ltd. 1 pam.
Inst. of Marine Engrs. 1 bound vol.
Kansas City Southern Ry. Co. 1 pam.
Koninklijk Inst. van Ingenieurs. 10 nos.
Lathbury & Spackman. 1 bound vol.
London, Ont.—Water Commrs. 1 pam.
Louisville & Nashville R. R. Co. 1 pam.
Mailloux, C. O. 1 bound vol.
Maine Central R. R. Co. 1 pam.
Mass.—State Board of Health. 1 bound vol.
Matthes, Gerard H. 1 pam.
Philadelphia Commercial Museum. 1 bound vol.
Platt, T. C. 6 pam.
Port Huron, Mich.—Water Commrs. 1 pam.
Reading, Pa.—Dept. of Water. 3 bound vol.
Rose Technic. 3 vol.
Saegmuller, G. N. 1 pam.
Smithsonian Inst. 1 bound vol.
Southern Pacific Co. 1 bound vol.
Thonindustrie-Zeitung. 1 bound vol., 1 vol.
U. S. Bureau of Foreign Commerce. 1 pam.
U. S. Bureau of Insular Affairs. 8 vol.
U. S. Civil Service Comm. 1 bound vol.
U. S. Commr. of Education. 1 bound vol.
U. S. Corps of Engrs. 3 bound vol., 14 specif.
U. S. Dept. of Agri. 1 pam.
U. S. Interstate Commerce Comm. 1 bound vol.
U. S. Lighthouse Board. 1 vol.
U. S. Naval Observatory. 1 pam.
U. S. Navy Dept. 1 vol., 2 pam.
U. S. Ordnance Office. 1 pam.
Univ. of Ill. Agri. Exper. Station. 3 pam.
Univ. of Texas Mineral Surv. 1 map.

BY PURCHASE.

Treatise on Wooden Trestle Bridges According to the Present Practice on American Railroads. By Wolcott C. Foster. Third Revised and Enlarged Edition. New York, John Wiley & Sons; London, Chapman & Hall, 1902.

The Practical Application of the Slide Valve and Link Motion to Stationary, Portable, Locomotive, and Marine Engines, with New and Simple Methods for Proportioning the Parts. By William S. Auchincloss, M. Am. Soc. C. E. Fourteenth Edition, Revised. New York, D. Van Nostrand Company, 1901.

Annual Report of the Signal Officer to the Secretary of War, 1871, '73, '74. Washington, Government Printing Office, 1871–74.

Army Meteorological Register for Twelve Years, from 1843 to 1854, Inclusive, Compiled from Observations Made by the Officers of the Medical Department of the Army, at the Military Posts of the United States, Prepared under the Direction of Brevet Brigadier General Thomas Lawson, Surgeon General, United States Army. Washington, A. O. P. Nicholson, 1855.

Topographical Drawing and Sketching, Including Applications of Photography. By Henry A. Reed. Fourth Edition—Revised and Enlarged. 2 vol. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1897.

Building Construction and Superintendence. By F. E. Kidder. Part I, Fifth Edition. Part II, Fourth Edition. New York, William T. Comstock, 1902.

Architects' and Builders' Pocket-Book of Mensuration, Geometry, Geometrical Problems, Trigonometrical Formulas and Tables, Strength and Stability of Foundations, Walls, Buttresses, Piers, Arches, Posts, Ties, Beams, Girders, Trusses, Floors, Roofs, etc. In Addition to which is a Great Amount of Condensed Information: Statistics and Tables Relating to Carpentry, Masonry, Drainage, Painting and Glazing, Plumbing, Plastering, Roofing, Heating and Ventilation, Weights of Materials, Capacity and Dimensions of Noted Churches, Theatres, Domes, Towers, Spires, etc., with a Great Variety of Miscellaneous Information. By Frank E. Kidder. Thirteenth Edition, Revised and Greatly Enlarged. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1902.

SUMMARY OF ACCESSIONS.

From December 10th, 1902, to January 13th, 1903.

Donations (including 61 duplicates and 10 numbers completing volumes of periodicals)	269
By Purchase	10
Total	279

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MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(December 10th, 1902 to January 13th, 1903.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings*, Eng. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
(7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine*, New York City, 25c.
(10) *Cassier's Magazine*, New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News*, New York City, 15c.
(14) *The Engineering Record*, New York City, 12c.
(15) *Railroad Gazette*, New York City, 10c.
(16) *Engineering and Mining Journal*, New York City, 15c.
(17) *Street Railway Journal*, New York City, 35c.
(18) *Railway and Engineering Review*, Chicago, Ill., 10c.
(19) *Scientific American Supplement*, New York City, 10c.
(20) *Iron Age*, New York City, 10c.
(21) *Railway Engineer*, London, England, 25c.
(22) *Iron and Coal Trades Review*, London, England, 25c.
(23) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal*, New York City, 10c.
(25) *American Engineer*, New York City, 20c.
(26) *Electrical Review*, London, England.
(27) *Electrical World and Engineer*, New York City, 10c.
(28) *Journal*, New England Water-Works Assoc., Boston, $1.
(29) *Journal*, Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
(31) *Annales de l' Assoc. des Ing. Sortis des Ecôle Spéciales de Gand*, Brussels, Belgium.
(32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
(33) *Le Génie Civil*, Paris, France.
(34) *Portefeuille Économique des Machines*, Paris, France.
(35) *Nouvelles Annales de la Construction*, Paris, France.
(36) *La Revue Technique*, Paris, France.
(37) *Revue de Mécanique*, Paris, France.
(38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
(39) *Railway Master Mechanic*, Chicago, Ill., 10c.
(40) *Railway Age*, Chicago, Ill., 10c.
(41) *Modern Machinery*, Chicago, Ill., 10c.
(42) *Transactions*, Am. Inst. Elec. Engrs., New York City, 50c.
(43) *Annales des Ponts et Chaussées*, Paris, France.
(44) *Journal*, Military Service Institution, Governor's Island, New York Harbor, 50c.
(45) *Mines and Minerals*, Scranton, Pa., 20c.
(46) *Scientific American*, New York City, 8c
(47) *Mechanical Engineer*, Manchester, England.
(54) *Transactions*, Am. Soc. C. E., New York City, $5.
(55) *Transactions*, Am. Soc. M. E., New York City, $10.
(56) *Transactions*, Am. Inst. Min. Engrs., New York City, $5.
(57) *Colliery Guardian*, London, England.
(58) *Proceedings*, Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(59) *Transactions*, Mining Inst. of Scotland, London and Newcastle-upon-Tyne.
(60) *Municipal Engineering*, Indianapolis, Ind., 25c.
(61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburg, Pa.
(63) *Minutes of Proceedings*, Inst. C. E., London, England.
(64) *Power*, New York City, 20c.
(65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting*, London, England, 15c.
(67) *Cement and Engineering News*, Chicago, Ill., 25c.
(68) *Mining Journal*, London, England.

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Bridge.

The Footbridge for Building the Cables of the New East River Bridge.* Isaac Harby, Jun. Am. Soc. C. E. (54) Vol. xlix.
The Widening of London Bridge.* (12) Serial beginning Dec. 5.
Construction of the Blackwell's Island Bridge Masonry.* (14) Dec. 13.
The Design and Construction of a 50-ft. Brick Arch Culvert across Rock Creek, Washington, D. C.* W. J. Douglas. (13) Dec. 25.
Bridges, Foundations, Docks and Water Fronts, and Canals. William H. Burr, M. Am. Soc. C. E., M. Inst. C. E. (14) Jan. 3.
The Monongahela Bridge.* (14) Jan. 3.
The Mississippi River Bridge at Thebes.* (15) Jan. 9.
Le Pont Monumental de Luxembourg.* Cart. (38) Dec.
Nouvelle Méthode pour le Calcul du Moment de Résistance *i*/*v* et du Moment d'Inertie I.* Lathuillière. (36) Dec. 10.

Electrical.

Investigations of Magnetic Fields, with reference to Ore-Concentration.* Walter R. Crane. (56) Vol. xxxi.
Three-Wire System for Variable Speed Motor Work.* N. W. Storer. (42) Dec.
The Storage Battery as a Factor in Speed Control.* H. Blohs. (42) Dec.
Electrically Operated Coal Hoist Having Variable Speed Control.* P. O. Keilholtz. (42) Dec.
A Series-Parallel System of Speed Control.* Geo. W. Fowler. (42) Dec.
Multiple Unit, Voltage Speed Control for Trunk Line Service.* H. Ward Leonard. (42) Dec.
Continuous Current Motors for Machine Tools. F. O. Blackwell. (42) Dec.
The Use of Specification Forms in Designing Dynamo Machinery, and the Design of a Rotary Converter. H. M. Hobart. (26) Serial beginning Dec. 5.
Commutation.* H. St. Hill Mawdsley. (26) Dec. 5.
Experiments on the Application of Pupin's System to Telephone Circuits. F. Dolezalek and A. Ebeling. (26) Serial beginning Dec. 12.
Cleckheaton Electricity Works.* (26) Dec. 12.
Imperial Telegraphic Communication. Charles Bright. (26) Serial beginning Dec. 12.
Some Limits in Heavy Electrical Engineering. James Swinburne. (Presidential address delivered before the Inst. of Elec. Engrs.) (47) Serial beginning Dec. 12; (26) Serial beginning Dec. 12.
Electrochemical Oscillations.* Woolsey McA. Johnson. (27) Dec. 13.
Three-Phase Measurements.* A. S. McAllister. (27) Dec. 13.
The Manufacture and Laying of the Vera Cruz-Frontera-Campeche Cable for the Mexican Government.* (27) Dec. 13.
Photometry for Electricians and Others. (66) Dec. 16.
On Electrons. *Sir* Oliver Lodge. (Paper read before the Inst. Elec. Engrs.) (26) Serial beginning Dec. 19.
A Criticism of Present-Day Continuous-Current Designing. Fred. W. Davies. (26) Dec. 19.
Electric Heating and Lighting in the Carnegie Residence, New York.* (14) Dec. 20.
Ruhmer's Photoelectric Telephone.* A. Frederick Collins. (27) Dec. 20.
A French System of Train Lighting. P. Letheule. (27) Dec. 20.
Electric Furnaces.* Clinton Paul Townsend. (27) Dec. 20.
The New Niagara.* Waldon Fawcett. (62) Dec. 25.
Electricity Supply in Hastings.* (26) Dec. 26.
The Designing of Polyphase Current Machines. David Bergman. (26) Dec. 26.
300-Kilowatt Triple-Expansion Engine; Middlesbrough Electricity Works.* (11) Dec. 26.
Electrically-Driven Quadruplex Two-Stage Compressors, and Their Use for Power in Collieries and Works.* (22) Dec. 26.
The Cauvery Falls Power Plant.* (16) Dec. 27.
The Cost of Electric Light and Electric Light Plants to Municipalities. (60) Jan.
Electric Power in India; the Cauvery Falls Plant.* J. H. Thomson. (10) Jan.
Economy in the Design and Operation of Electric Plants.* Percival Robert Moses. (9) Jan.
Modern Tendencies in the Development and Transmission of Power. John Joseph Flather, M. Am. Soc. M. E. (Abstract of Vice-Presidential address before the Am. Assoc. for the Advancement of Science.) (13) Jan. 1.
The Water and Electric Power System of the Pike's Peak Power Co., Col.* W. P. Hardesty. (13) Jan. 1.
Electrical Distribution of Power in Industrial Establishments. Cecil P. Poole, Member A. I. E. E. (14) Jan. 3.
The First Three-Phase Power Transmission Plant in Europe Operating at 30,000 Volts.* H. Behn-Eschenburg. (27) Jan. 3.
Analysis of Wireless Telegraph Systems in 1902.* A. Frederick Collins. (27) Jan. 3.
The Relation of Synchronous Impedance to the Impedance at Standstill. F. Townsend, H. P. Freund, W. I. Reich. (27) Jan. 3.
Telephone Cables, Cost of Cable Wire Plant. Arthur V. Abbott. (27) Jan. 3.
New Shops of the British Thomson-Houston Company.* (27) Jan. 3.
Three-Phase Measurements. Leslie L. Perry. (27) Jan. 10.
Electrical Supply from Water Power at Portland, Me.* Alton D. Adams. (27) Jan. 10.

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* Illustrated.

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Mesure à l'Aide d'un Seul Wattmètre de la Puissance dans les Circuits Équilibrés, Parcourus par des Courants Triphasés.* Octave Robert. (36) Dec. 10.
Station Centrale Électrique de Waterside à New York.* F. Drouin. (33) Dec. 18.
Fabrication des Lampes Electriques à Incandescence.* Paul Razous. (33) Dec. 20.

Marine.

The Submarine Torpedo Boat, *Protector*.* (12) Dec. 12.
The Application of Turbine Propulsion to Passenger Vessels.* Herbert C. Fyfe. (46) Dec. 13.
The New German Battleship *H*.* (12) Dec. 19.
The New Armored Cruisers *Tennessee* and *Washington*.* (46) Dec. 27.
Developing a British War Post, an Outlay of £4 500 000 (Dockyard Extension).* Archibald S. Hurd. (10) Jan.
A New Departure in British Cruiser Machinery; the Question of Water-Tube Boilers.* George Halliday. (10) Jan.
The New York Shipbuilding Company's Plant, Camden, N. J.* (14) Serial beginning Jan. 3.

Mechanical.

Problems in Hauling and Hoisting. Alexander Bowie. (56) Vol. xxxi.
The D'Auria Air-Compressor.* Henry G. Morris. (56) Vol. xxxi.
Machine Tools. Jas. K. Cullen. (61) Nov. 18.
Some Notes on Several Types of Mantles for Incandescent Gas Burners. William Lincoln Smith. (7) Dec.
The Operation of Machine Shops by Individual Electric Motors. R. T. E. Lozier. (42) Dec.
Modern Handling of Iron Ore on the Great Lakes.* Jas. N. Hatch. (4) Dec.
Foundry Management in the New Century.* Robert Buchanan. (9) Serial beginning Dec.
Flow Through Centrifugal Pumps.* Jas. Alex. Smith. (Paper read before the Victorian Inst. of Engrs.) (11) Dec. 5.
The Brunck System of By-Product Coke Ovens.* (22) Dec. 5.
The Lighting of Factories. J. H. Brearley. (Paper read before the Manchester District Inst. of Gas Engrs.) (66) Dec. 9.
Briquetting Iron Flue Dust. R. M. Hale. (20) Dec. 11.
High Pressure Steam Piping. William Andrews. (Paper read before the Engine Builders' Assoc. of the U. S.) (20) Dec. 11; (13) Dec. 18; (14) Dec. 20.
Manufacture of Steel by the Electric Furnace.* (Translation with additions by P. McN. Bennie of a paper by Charles Bertolus of St. Etienne, France, entitled, "Notice sur la Fabrication des Aciers au Four Electrique.") (20) Dec. 11.
The Use of Blast Furnace Gas in Gas Engines.* Cecil A. Cochrane. (Abstract of Paper read before the Cleveland Inst. Engrs.) (22) Dec. 12; (11) Serial beginning Dec. 12.
Gas Engine Diagrams.* W. H. Booth. (26) Dec. 12.
Gas Engines for Electric Stations. G. H. Baillie. (12) Dec. 12.
Plant for Testing Cables at High Pressures. Stuart A. Russell. (12) Dec. 12.
Three Cylinder Compound Gas Engine.* (12) Dec. 12.
Compressed Air as a Transportation Agent.* Waldon Fawcett. (46) Dec. 13.
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New Gas-Works for Glyncorrwg; a Design for a Small Plant.* (66) Dec. 16.
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Compression of Ingots.* A. Harmet. (Paper read before the Iron and Steel Institute of Düsseldorf.) (62) Dec. 18.
The Development of Tool Steel. Edmund L. French. (Read before Am. Assoc. for the Advancement of Science, Pittsburg.) (62) Dec. 18.
The Double-Acting Two-Cycle Gas Engine, Körting's Patent. (22) Dec. 19.
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Steam Turbines; with Special Reference to the De Laval Turbine.* Konrad Andersson. (Paper read before the Inst. of Engrs. and Shipbuilders in Scotland.) (47) Serial beginning Dec. 6; (abstract) (17) Dec. 20.
Notes on Recent Experiments with Mechanical Lamps.* W. R. Crane. (16) Dec. 20.
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The Future of Coal Gas and Allied Illuminants. Vivian B. Lewes. (29) Serial beginning Dec. 26.
The Machinery for the Consett Iron Company's Garesfield and Derwenthaugh Inclined Railway.* (22) Dec. 26.

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300-Kilowatt Triple-Expansion Engine; Middlesbrough Electricity Works.* (11) Dec. 26.
Steel Ball-Bearings.* (11) Dec. 26.
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Municipal Motor Wagons.* Archibald Sharp, A. M. Inst. C. E. (Paper read at Conference of Engrs. and Surveyors, Sanitary Inst. Cong.) (47) Dec. 27.
Flywheel Capacity for Engine-Driven Alternators. Walter I. Slichter. (47) Dec. 27.
The Körting Gas Engine.* (18) Dec. 27.
Large Stop Valves for High Pressure Steam.* J. Hamilton Gibson. (Paper read before the North of England Inst. of Engrs. and Shipbuilders.) (57) Dec. 24; (47) Serial beginning Dec. 27.
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Some Economical Gas Burning Appliances.* W. H. Test. (24) Dec. 29.
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Fuel Briquettes in Germany, How They Are Made and Used.* Frank H. Mason. (10) Jan.
Cut Gearing and Some American Machinery for Its Manufacture.* Oscar J. Beale. (10) Jan.
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Some Interesting New Driving-Wheel Lathes, Extra Heavy and of Special Design for Very Rapid Cutting.* (25) Jan.
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Some Requirements of Machine Tool Operation; with Special Reference to the Motor Drive.* Charles Day. (Condensed from paper read before the N. Y. Elec. Soc.) (13) Jan. 8; (20) Jan. 8; (15) Jan. 9; (27) Jan. 10; (25) Jan. 9.
New Power Plant, Michigan Central Shops, Jackson, Mich.* (18) Jan. 10.
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Chromite as a Hearth-Lining for a Furnace Smelting Copper-Ore.* William Glenn. (56) Vol. xxxi.
A Study of the Effect of Heat-Treatment on Crucible Steel Containing One Per Cent. of Carbon.* George W. Sargent. (56) Vol. xxxi.
The Constitution of Cast-Iron, with Remarks on Current Opinions Concerning It.* H. M. Howe. (56) Vol. xxxi.
The Use of the Tri-Axial Diagram in the Calculation of Slags.* Ernest A. Hersam. (56) Vol. xxxi.
An Electric-Resistance Magnesia Crucible-Furnace for Laboratory-Use.* Henry M. Howe. (56) Vol. xxxi.
The Alloys of Lead and Tellurium.* Henry Fay and C. B. Gillson. (56) Vol. xxxi.
The Electrical Burner for Blast-Furnaces. F. L. Grammer. (56) Vol. xxxi.
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The Litharge Process of Assaying Copper-Bearing Ores and Products, and the Method of Calculating Charges. Walter G. Perkins. (56) Vol. xxxi.
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A Crystalline Sulphide in Pig-Iron.* Andrew Blair and Porter W. Shimer. (56) Vol. xxxi.

The Treatment of Tailings by the Cyanide Process at the Athabasca Mine, near Nelson, British Columbia.* E. Nelson Fell. (56) Vol. xxxi.

Experiments with Bromo-Cyanogen on Southern Gold-Ores. S. H. Brockunier. (56) Vol. xxxi.

The Detection and Estimation of Small Quantities of Gold and Silver.* Luther Wagoner. (56) Vol. xxxi.

The Magnetic Properties of Iron and Steel at Liquid Air Temperatures.* C. C. Trowbridge. (6) Nov.

Electricity in Modern Steel Making.* John Hays Smith. (9) Dec.

Malleable Cast Iron. H. E. Diller. (From the *Journal of the Amer. Foundrymen's Assoc.*) (13) Dec. 11.

Aluminum and its Alloys. (19) Dec. 18.

Effect of Re-heating upon the Coarse Structure of Over-Heated Steel. K. Fredrik Göransson. (12) Dec. 19.

The Treatment of Cupriferous Gold Ores by Cyanide of Potassium. Louis Janin, Jr. (16) Dec. 20.

Cyaniding Concentrates by Percolation at Choukpazat. C. M. Wright. (Paper read before the Inst. of Mining and Metallurgy, London.) (16) Dec. 20.

The Copper Assay by the Iodide Method.* Albert H. Low. (From the *Journal*, Amer. Chemical Soc., Nov., 1902.) (16) Dec. 27.

An Attempted Defense of the Electric Smelting of Iron Ores. (13) Jan. 8.

A New Ore Classifier.* (13) Jan. 8.

The Fan Blower and Its Application to the Cupola Furnace. R. B. Hayward. (Paper read before the Pittsburgh Foundrymen's Assoc.) (20) Jan. 8.

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The Great Oil-Well near Beaumont, Texas.* Anthony F. Lucas. (56) Vol. xxxi.

Some Principles Controlling the Deposition of Ores. C. R. Van Hise. (56) Vol. xxxi.

The Deposits of Copper-Ores at Ducktown, Tenn. J. F. Kemp. (56) Vol. xxxi.

Remarks on Mine-Surveying Instruments, with Special Reference to Mr. Dunbar D. Scott's Paper on their Evolution and its Discussion.* H. D. Hoskold. (56) Vol. xxxi.

Problems in the Geology of Ore-Deposits. J. H. L Vogt. (56) Vol. xxxi.

The Rôle of the Igneous Rocks in the Formation of Veins. J. F. Kemp. (56) Vol. xxxi.

The Formation of Bonanzas in the Upper Portions of Gold Veins.* T. A. Rickard. (56) Vol. xxxi.

The Coal-Fields of Northeastern China.* Noah Fields Drake. (56) Vol. xxxi.

Note on Hydraulic Mining in Low-Grade Gravel. William H. Radford. (56) Vol. xxxi.

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Some Features of Irrigation. Wm. O. Webber. (14) Jan. 10.

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The Panama Canal, and the Regulation of the Chagres River. Gen. Henry L. Abbott. (9) Dec.

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Lake Bohio, the Summit Level of the Panama Canal.* George S. Morison. (9) Jan.

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Notice sur le Port de Trieste et sur les Travaux d'Agrandissement Projetés et en Cours d'Exécution. G. B. Antonelli. (30) Dec.

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* Illustrated.

Vol. XXIX. FEBRUARY, 1903. No. 2.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

FIFTIETH ANNUAL MEETING.*

January 21st, 1903.—The meeting was called to order at 10.45 A. M., Vice-President Charles C. Schneider in the chair; Charles Warren Hunt, Secretary.

The reading of the minutes of the meeting of January 7th, 1903, was dispensed with.

Messrs. G. S. Stoddart and C. D. Pollock were appointed tellers to canvass the Ballot for Officers for the ensuing year.

The Annual Report of the Board of Direction† and the Annual Reports of the Secretary† and of the Treasurer† for the year ending

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* A full report of the Fiftieth Annual Meeting is printed on pages 42 to 80 of this number of *Proceedings*.

† The Annual Reports of the Board of Direction, the Secretary and the Treasurer may be found on pages 5 to 14 of the *Proceedings* for January, 1903 (vol. xxix).

December 31st, 1902, were presented, and, on motion, duly seconded, accepted.

The Progress Report of the Special Committee on Uniform Tests of Cement* was presented by George S. Webster, M. Am. Soc. C. E., Chairman of that Committee.

At 11.20 A. M. the chair was taken by President Robert Moore.

On motion, duly seconded, the report was received and ordered printed in *Proceedings*, and the Committee continued.

On motion, duly seconded, the Committee was thanked for its labor and report.

A progress report from the Special Committee on Rail Sections was presented by L. F. G. Bouscaren, M. Am. Soc. C. E., Chairman of that Committee.

On motion, duly seconded, the Committee was continued.

The following were appointed members of the Nominating Committee for two years:

George W. Tillson	Representing	District	No.	1.
J. P. Snow	"	"	"	2.
Edward A. Bond	"	"	"	3.
Richard Khuen, Jr	"	"	"	4.
L. E. Chapin	"	"	"	5.
John B. Atkinson	"	"	"	6.
D. C. Henny	"	"	"	7.

The Secretary reported that the Board of Direction had awarded the prizes for the year ending with the month of July, 1902, as follows:

The Norman Medal to Paper No. 911, entitled, "Experiments at Detroit, Mich., on the Effect of Curvature upon the Flow of Water in Pipes," by Gardner S. Williams, M. Am. Soc. C. E.; Clarence W. Hubbell, Assoc. M. Am. Soc. C. E., and George H. Fenkell, Jun. Am. Soc. C. E.

The Thomas Fitch Rowland Prize to Paper No. 910, entitled, "Description of Coos Bay, Oregon, and the Improvement of Its Entrance by the Government," by William W. Harts, M. Am. Soc. C. E.

The consideration of the following proposed amendment to the Constitution was then taken up:

Amend Article III of the Constitution as follows:

Section 2, first line, after the words "Society as" strike out the words "Member or as Associate" and insert the words "a Corporate"; second line, after the word "to" strike out the words "either grade of."

Section 2, Art. III, will then read, "An application for admission to the Society as a Corporate Member, or for transfer from any other grade to Corporate Membership shall embody," the rest of the section standing as now.

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* This report is printed in *Proceedings* for January, 1903.

Section 3, third line, after the word "membership" strike out the words "in any grade," and after the word "transfer" strike out the words "from one grade to another"; twelfth line, for the word "may" substitute the word "shall." The section will then read as follows:

"At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all new applications received for membership or for transfer, which list shall be dated and shall contain a concise statement of the record of each applicant and the names of the references in the case of Corporate Member, and endorsers in the case of Associate, Junior or Fellow, with a request that members transmit to the Board any information in their possession which may affect the disposition of the applications. Not less than twenty days after the issue of such list, the Board of Direction shall consider these applications together with any information in regard to the applicants that may have been received; may make further inquiries, if deemed expedient; shall classify the applicant with his consent, and on applications for Corporate Membership may direct a ballot."

This amendment was proposed by Messrs. H. G. Prout, G. S. Williams, Alf. P. Boller, Geo. Y. Wisner and Geo. F. Swain, and was sent to all Corporate Members on October 2d, 1902.

The amendment was discussed, but was not amended.

A resolution,* relative to the death of Abram S. Hewitt, was offered by George S. Morison, Past-President, Am. Soc. C. E., seconded by Robert W. Hunt, M. Am. Soc. C. E., and carried unanimously.

J. A. Ockerson, M. Am. Soc. C. E., offered the following resolution:

Resolved, That it is the sense of this meeting that the American Society of Civil Engineers should co-operate with the officers of the Louisiana Purchase Exposition Company, in the inauguration of an International Congress of Engineering, to be held in St. Louis, during the Exposition period of 1904, and be it further

Resolved, That the Board of Direction be, and is, hereby, authorized and requested to take such steps as may be necessary to carry out the provisions of the foregoing resolution.

The resolution, being duly seconded, was carried.

The Secretary presented the report† of the tellers appointed to canvass the Ballot for Officers for the ensuing year.

The President announced the election of the following officers:

President, to serve one year:

ALFRED NOBLE, New York City.

Vice-Presidents, to serve two years:

L. F. G. BOUSCAREN, Cincinnati, Ohio.
JAMES D. SCHUYLER, Los Angeles, Cal.

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* See page 70.

† See page 72.

Treasurer, to serve one year:
Joseph M. Knap, New York City.

Directors, to serve three years:
District No. 1.—**Alfred Craven**, Yonkers, N. Y.
District No. 1.—**Joseph O. Osgood**, Plainfield, N. J.
District No. 4.—**George S. Davison**, Pittsburg, Pa.
District No. 6.—**E. C. Lewis**, Nashville, Tenn.
District No. 6.—**Hunter McDonald**, Nashville, Tenn.
District No. 7.—**Elwood Mead**, Cheyenne, Wyo.

Mr. Morison and Mr. Croes conducted Mr. Noble, the President-elect, to the chair.

The Secretary read a letter from Robert Moore, Past-President, Am. Soc. C. E., to the effect that, in pursuance of the resolution passed at the last Annual Convention an oak tree had been planted at Mt. Vernon as a memorial of the visit of the Society in May, 1902; and that this work had been executed by Messrs. Gifford Pinchot and George B. Sudworth, of the Bureau of Forestry, and Harrison H. Dodge, Superintendent of the Mt. Vernon Estate.

It was moved, duly seconded and carried that the Secretary be instructed by this meeting to extend the thanks of the Society to the gentlemen named for executing this commission.

Adjourned.

February 4th, 1903.—The meeting was called to order at 8.50 P. M., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 100 members and 20 guests.

The minutes of the meeting of January 7th, 1903, were approved as printed in *Proceedings* for January, 1903. The approval of the minutes of the Annual Meeting was deferred until they are printed in the *Proceedings* for February, 1903.

An informal discussion on "The Preservation of Materials of Construction," was opened by William Barclay Parsons, M. Am. Soc. C. E., who exhibited perfectly preserved specimens of wood taken from the excavation for the Metropolitan Underground Railway of Paris at the site of the ancient "Porte du Temple," founded during the reign of Charles V, 1364–1380. He also showed a section of wooden water pipe, taken from the excavation for the New York Rapid Transit Subway on Center Street, which had been in the ground about 100 years, and yet was perfectly preserved. The Secretary presented a letter from Mr. James Forgie, Chief Assistant Engineer of the City and South London Deep Underground Railways, transmitting and describing a piece of iron about 200 years old, in the form of a masonry cramp or bonding iron, on which no trace of rusting could be seen. The iron had been found, in 1899, embedded in the sandstone masonry of a pier in the crypt of St. Mary Woolnoth Church, in London, where the foundations of a railroad depot were being made. The letter was accompanied by a photograph of the crypt, showing the place where the iron was found. Rudolph P. Miller, Assoc. M. Am. Soc. C. E., described the condition of the metal in a large building of modern construction, in New York City, which is now being taken down, and illustrated his remarks with lantern slides.

The subject was discussed further by Messrs. George Hill, W. W. Kenley, George A. Just, Edward P. North, Oscar Lowinson and Henry B. Seaman.

Ballots for membership were canvassed, and the following candidates were elected:

As Members.

Harry Sherman Bosler, Akron, Ala.
George Elvin Datesman, Philadelphia, Pa.
Arthur James Dyer, Nashville, Tenn.
William Henry Finley, Winnetka, Ill.
Graham Denby Fitch, Little Rock, Ark.
Isham Randolph, Chicago, Ill.
Charles Winslow Sherman, Boston, Mass.
Henry Clark Thompson, New York City.
George Monroe Wisner, Chicago, Ill.

As Associate Members.

James Marcus Bandy, Greensboro, N. C.
Edward Christian Henry Bantel, Austin, Tex.
Sam Wigfall Bradshaw, Steelton, Pa.
Per Brynn, Pittsburg, Pa.
Harris De Haven Connick, San Francisco, Cal.
Richard Turner Dana, Ridgewood, N. J.
Edward Bliss Day, St. Louis, Mo.
Horace De Remer Haight, Albany, N. Y.
Joseph Milton Howe, Houston, Tex.
Henry Scudder Jaudon, Birmingham, Ala.
George Albert McKay, Newport, R. I.
Hibbard Atwill Paine, Chandler, Okla. T.
William Edwin Pincombe, Calcutta, India.
James Vincent Rockwell, Eagle Grove, Iowa.
Edward Moses Stayton, Hope, Ark.
Lazarus White, New York City.

The Secretary announced the election of the following candidates by the Board of Direction on February 3d, 1903:

As Associates.

Rudolf Caspar Carl Marie Bernegau, New York City.
Otto Balthazar Keller, New York City.
Eugene McGrath Quirk, Montreal, Que., Canada.

As Juniors.

John Seager Adey, New York City.
Robert Jay Bassett, Steelton, Pa.
John Anthony Crook, Falls City, Neb.
Shukichi Fujino, Pencoyd, Pa.
Hugh Melvin George, Meridian, Miss.
Frederick Appel Hausman, Bridgeport, Pa.
Vernet Albert Kauffman, Alamogordo, N. Mex.
Henry Jacob Kolb, Steelton, Pa.
George Edson Philip Smith, Tucson, Ariz.
Travis Logan Smith, Jr., Fulshear, Tex.
Charles Underhill Stepath, New York City.
Carl Tombo, New York City.
Edward Lloyd Walker, Paterson, N. J.
Ezra Bailey Whitman, New York City.
Waldo Gilman Wildes, Clinton, Mass.
Benjamin Lee Williams, Jr., West Orange, N. J.
Carolus Hermann Zane-Cetti, Fort Worth, Tex.

The Secretary announced the death of the following members:

Watson Wellman Rich, elected Member September 5th, 1883; died January 12th, 1903.

Estevan Antonio Fuertes, elected Member February 17th, 1869; died January 16th, 1903.

Elnathan Sweet, elected Member November 6th, 1878; died January 27th, 1903.

Adjourned.

February 18th, 1903.—The meeting was called to order at 8.50 P. M., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 121 members and 35 guests.

A paper entitled, "The Panama Canal," by George S. Morison, Past-President, Am. Soc. C. E., was presented by the author, and illustrated with lantern slides.

A written communication on the subject, by M. Meigs, M. Am. Soc. C. E., was presented by the Secretary.

The subject was discussed orally by Messrs. Theodore Paschke, W.

H. Burr, C. L. Harrison, Boyd Ehle, W. E. Crane, P. Bunau-Varilla and the author.

The Secretary announced the death of John Walker Barriger, Jr., elected Junior May 31st, 1898; Associate Member, April 2d, 1902; died December 19th, 1902.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

January 21st, 1903.—2.30 P. M.—President Noble in the Chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Buck, Craven, Davison, Jackson, Knap, Moore, Osgood, Pegram, Schneider, Swain and Wilgus.

A Committee on Finance, a Library Committee, a Committee on Publications, and a Committee on Membership, were appointed.

A letter-ballot was ordered for the election of a Secretary for the ensuing year.

Adjourned.

February 3d, 1903.—8.40 P. M.—President Noble in the Chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Craven, Croes, Endicott, Knap, Kuichling, Osgood, Swain and Wilgus.

The ballot for Secretary was canvassed, by tellers appointed for the purpose, and Chas. Warren Hunt was declared elected.

The resolution, passed at the Annual Meeting, recommending cooperation with the officers of the Louisiana Purchase Exposition Company, in the matter of a proposed International Congress of Engineering, to be held in St. Louis during the Exposition of 1904, was referred to a Special Committee of the Board.

The resignations of Horace See, M. Am. Soc. C. E., and C. W. Walton, M. Am. Soc. C. E., were accepted.

A Committee of the Board was appointed to take up the matter of a proposed revision of the rules for the award of the Collingwood Prize for Juniors.

Applications were considered, and other routine business transacted.

Three candidates for Associate and seventeen for Junior were elected.*

Adjourned.

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* See page 40.

REPORT IN FULL OF THE FIFTIETH ANNUAL MEETING, JANUARY 21st and 22d, 1903.

Meeting called to order.

Wednesday, January 21st, 1903.—The meeting was called to order at 10:45 A. M.; Vice-President C. C. Schneider in the chair; Charles Warren Hunt, Secretary.

THE CHAIRMAN.—The minutes of the meeting of January 7th, 1903, will be printed in the January number of *Proceedings*, and come up in due course for action at the meeting of February 4th. In view of this fact. the reading of those minutes will be dispensed with, if there are no objections.

Tellers appointed.

The time has arrived now for canvassing the votes for officers, and I will appoint Messrs. G. S. Stoddard and C. D. Pollock as tellers. The ballot will be closed, in accordance with the Constitution, at twelve o'clock noon. Any member present who has not voted may vote, up to that time. In order to finish the count of the ballot in time, the tellers may proceed at once with the count.

The next business is the reading of the report of the Board of Direction for 1902.

Report of the Board of Direction.

The Secretary read the report of the Board of Direction.*

THE CHAIRMAN.—You have heard the report of the Board of Direction. What action will you take ?

A MEMBER.—I move that the report be received and placed on file.

Seconded and carried.

THE CHAIRMAN.—The report of the Secretary to the Board of Direction.

The Secretary read his report.†

THE CHAIRMAN.—You have heard the Secretary's report. What action will you take in reference to it ?

It was moved and seconded that the report be received and placed on file.

Carried.

THE CHAIRMAN.—The report of the Treasurer.

The Treasurer read his report.‡

THE CHAIRMAN.—Gentlemen, what action will you take with reference to the Treasurer's report ? If there are no objections, it will be received and placed on file.

Reports of Special Committees.

The report of the Special Committee on Uniform Tests of Cement, Mr. Geo. S. Webster, Chairman.

Report read by Mr. Webster.§

(At 11.20 A. M. the chair was taken by the President, Mr. Robert Moore.)

THE PRESIDENT.—You have heard the report, and it is now open for discussion or for such action as the meeting sees fit to take.

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* See *Proceedings*, Vol. xxix, p. 5 (January, 1903).
† See *Proceedings*, Vol. xxix, p. 12 (January, 1903).
‡ See *Proceedings*, Vol. xxix. p. 14 (January, 1903).
§ See *Proceedings* for January, 1903.

J. **James R. Croes**, Past-President, Am. Soc. C. E.—I move that the report be received and printed in the *Proceedings*, and the Committee continued.

Seconded and carried.

E. B. **Codwise**, M. Am. Soc. C. E.—I move that the Committee be thanked for their labor and their report.

Seconded and carried.

The President.—The next thing in order is the report from the Committee on Rail Sections; Mr. Bouscaren, Chairman. I believe he has a progress report.

The report was read by Mr. Bouscaren as follows:

"The Special Committee on Rail Sections would report that it has made progress in its labors; has been and is in correspondence with the Chief Engineers of many of the railroads of the United States and Canada; and that the reports received from them show greater proportionate wear of the heavier than of the lighter sectioned rails.

"They would also report that the steel rail manufacturers of the United States have appointed a committee to act in consultation with your committee, and that one joint session has been held. Your committee asks to be continued."

"G. **Bouscaren**,
"*Chairman.*"

The President.—You have heard the report, gentlemen, and also the request of the Committee that they be continued. What action will you take?

Mr. Codwise.—I move that the request be granted.

Seconded and carried.

Nominating Committee.

The President.—The next order of business is action upon the nominations for the seven geographical districts for members of the next Nominating Committee. We will hear the reports of the nominations which have been made by the members of those districts.

The Secretary.—The report from District No. 1 is as follows:

District No. 1.—Total number of votes received, 98; distributed as follows:

George W. Tillson	24
Frederick S. Odell	19
Henry W. Hodge	16
C. H. Graham	3
George S. Rice	3
J. V. Davies	2
J. J. R. Croes *	2
George B. Francis	2
Charles S. Gowen	2
Allen Hazen	2
O. F. Nichols	2
T. Kennard Thomson	2
S. C. Thompson	2

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* Ineligible.

Nominating Committee (Continued).

The following have received one vote each:

Wm. Henry Baldwin,
William H. Burr,
S. L. F. Deyo,
William B. Fuller,
Martin Gay,
S. W. Hoag, Jr.,
George A. Just,
Henry P. Morrison,
Edward P. North,
John F. O'Rourke,
E. E. Olcott,
J. Waldo Smith,
M. G. Starrett,
Edward Wegmann,
S. C. Weiskopf,
W. J. Wilgus,*
F. Stuart Williamson.

The Secretary.—The members of the Nominating Committee are to be elected by this meeting, and this is merely a suggestion to the meeting.

The President.—The Chair awaits suggestions in that matter, as to the pleasure of the Society.

J. M. Knap, Treasurer, Am. Soc. C. E.—I move that the usual course be adopted, and that we elect the man who receives the largest number of votes, who, I think, in this case, is Mr. Tillson.

Seconded.

The President.—It is moved and seconded that Mr. Tillson be the choice of the meeting for this district.

Carried.

The Secretary.—From District No. 2 the report is as follows:

District No. 2.—Total number of votes received, 42; distributed as follows:

J. P. Snow	11
Clarence B. Vorce	8
George A. Kimball *	4
Frederic P. Stearns	4
C. Frank Allen	2
S. E. Tinkham	2

The following have received one vote each:

A. S. Cheever,
Freeman C. Coffin,
Desmond FitzGerald,*
George B. Francis,*
Arthur W. French,
George R. Hardy,
C. M. Ingersoll,
Leonard Metcalf,
Mace Moulton,
Edward Sawyer,
George F. Swain.*

C. S. Allen, M. Am. Soc. C. E.—I move that Mr. J. P. Snow be elected on the Nominating Committee.

Seconded and carried.

The Secretary.—The District No. 3 report is as follows:

District No. 3.—Total number of votes received, 66; distributed as follows:

Edward A. Bond	29
Palmer C. Ricketts	19
Charles M. Morse	2
P. Alexander Peterson	2
Gardner S. Williams	2

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* Ineligible.

The following have received one vote each:

John F. Alden,*
Frank V. E. Bardol,
E. E. Brydone-Jack,
Robert Cartwright,
Clark Fisher,
William A. Haven,
John Kennedy,
Louis H. Knapp,
Olin H. Landreth,
E. H. McHenry,
Elnathan Sweet,
T. W. Symons.

The President.—Is there any motion?

Mr. E. B. Codwise.—I move that Mr. Edward A. Bond, having received the highest number of votes on the ballots, be declared elected.

Secônded and carried.

The Secretary.—The ballot from District No. 4 is as follows:

District No. 4.—Total number of votes received, 107; distributed as follows:

Richard Khuen, Jr	47
L. Y. Schermerhorn	22
H. M. Wilson	17
Bernard R. Green	2
Emil Swensson	2

The following have received one vote each:

Edward M. Bigelow,
William Bradford,
W. W. Card,
Arthur P. Davis,
George S. Davison,*
J. E. Greiner,
G. B. Hazlehurst,
John W. Hill,
N. H. Hutton,
Harvey Linton,
F. O. Maxson,
Mansfield Merriman,
William A. Pratt,
E. B. Taylor,
S. La R. Tone,
Samuel Tobias Wagner,*
George S. Webster.

The President.—Richard Khuen has the largest number of votes. It is moved and seconded that his election be made unanimous.

Carried.

The Secretary.—District No. 5 votes:

District No. 5.—Total number of votes received, 79; distributed as follows:

L. E. Chapin	25
J. B. Davis	8
William M. Hughes	6
R. B. C. Bement	3
G. A. Marr	3
John W. Alvord	2
Charles E. Greene	2
D. W. Mead	2
C. J. A. Morris	2
Samuel T. Wellman	2

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* Ineligible.

Nominating Committee (Continued).

The following have received one vote each:

Ward Baldwin,
L. F. G. Bouscaren,*
George H. Boynton,
W. M. Camp,
D. D. Carothers,
E. C. Carter,*
Clarence Coleman,
F. A. Delano,
James Dun,
R. L. Engle,
E. E. Haskell,
G. W. Kittredge,
Charles F. Loweth,
Ralph Modjeski,
G. B. Nicholson,*
Walter P. Rice,
H. E. Riggs,
James Ritchie,
J. W. Schaub,
E. C. Shankland,
Charles L. Strobel,
Job Tuthill,
L. L. Wheeler,
George Y. Wisner.

On motion, duly seconded, Mr. L. E. Chapin was elected as member of the Nominating Committee.

The Secretary.—District No. 6:

District No. 6.—Total number of votes received, 46; distributed as follows:

John B. Atkinson	5
Arthur Hider	3
J. A. L. Waddell	3
George G. Earl	2
L. F. Goodale	2
B. M. Harrod	2
C. D. Purdon	2
S. Bent Russell	2

The following have received one vote each:

James P. Allen,
William Cain,
W. W. Carson,
William H. Courtenay,
William P. Craighill,
Ben. L. Crosby,
Edward Flad,
B. M. Hall,
W. J. Hardee,
W. N. Hazlehurst,
E. C. Lewis,*
J. L. Ludlow,
D. W. Lum,
R. C. McCalla,
Hunter McDonald,*
F. A. Molitor,
R. Montfort,
Geo. B. Nicholson,
J. A. Ockerson,
M. P. Paret,
Hiram Phillips,
A. M. Scott,
B. F. Thomas,
C. C. Wentworth,
José R. Villalon.

The President.—Mr. John B. Atkinson has the largest number of votes. Is there any motion? If not, those who are in favor of the election of John B. Atkinson will say aye.

Carried.

The Secretary.—District No. 7:

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* Ineligible.

District No. 7.—Total number of votes received, 44; distributed as follows:

D. C. HENNY	9
C. E. GRUNSKY	4
C. D. MARX	4
ROBERTO GAYOL	2
HORACE A. SUMNER	2
A. J. TULLOCK	2
OTTO VON GELDERN	2

The following have received one vote each:

W. A. AYCRIGG,
JULIUS BAIER,
R. E. BRIGGS,
R. B. BURNS,
E. B. CUSHING,
GEORGE L. DILLMAN,
H. W. EDWARDS,
C. F. W. FELT,
W. W. FOLLETT,
C. E. FOWLER,
ARTHUR DEWITT FOOTE,
F. W. D. HOLBROOK,
JOHN D. ISAACS,
W. H. KENNEDY,
J. B. LIPPINCOTT,
J. W. MAXEY,
D. W. ROSS,
W. B. STOREY, Jr.,
JAMES D. SCHUYLER.*

THE PRESIDENT.—Mr. D. C. Henny has the largest number of votes. Those who are in favor of making him a member of the Nominating Committee signify by saying aye.

Carried.

Award of Prizes.

THE PRESIDENT.—This concludes that order of business. The next is the report from the Board of Direction as to the award of the medal and prizes for the year ending with July, 1902.

THE SECRETARY.—I am directed by the Board of Direction to report that the Norman Medal and the Thomas Fitch Rowland Prize have been awarded by the Board, in accordance with the recommendations of the following report:

To THE BOARD OF DIRECTION,
AMERICAN SOCIETY OF CIVIL ENGINEERS.

The undersigned respectfully recommend that awards of the Normal Medal and Thomas Fitch Rowland Prize for the year ending with the *Transactions* for July, 1902, be made as follows:

The Norman Medal to Paper No. 911, "Experiments at Detroit, Michigan, on the Effect of Curvature upon the Flow of Water in Pipes," by Gardner S. Williams, M. Am. Soc. C. E.; Clarence W. Hubbell, Assoc. M. Am. Soc. C. E., and George H. Fenkell, Jun. Am. Soc. C. E.

The Thomas Fitch Rowland Prize to Paper No. 910, "Description of Coos Bay, Oregon, and the Improvement of Its Entrance by the Government," by William W. Harts, M. Am. Soc. C. E.

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* Ineligible.

Award of Prizes (Continued).

There being no papers contributed exclusively by Juniors, no recommendation as to the award of the Collingwood Prize for Juniors can be made.

Respectfully submitted,

H M. CHITTENDEN,
BERNARD R. GREEN,
G. BOUSCAREN,
Committee.

THE PRESIDENT.—This is simply for information, and requires no action. The next order of business is the proposed amendment to the Constitution, which the Secretary will read.

Proposed Amendment to the Constitution.

THE SECRETARY.—This amendment to the Constitution has now gone through all the forms, and this meeting has the power to amend it and send it out as amended; if it is not amended at this meeting, it goes to the Society in the form in which it is at present.

Amend Article III of the Constitution as follows:

Section 2, first line, after the words "Society as" strike out the words "Member or as Associate" and insert the words "a Corporate"; second line, after the word "to" strike out the words "either grade of."

Section 2, Art. III, will then read, "An application for admission to the Society as a Corporate Member, or for transfer from any other grade to Corporate Membership shall embody," the rest of the section standing as now.

Section 3, third line, after the word "membership" strike out the words "in any grade," and after the word "transfer" strike out the words "from one grade to another"; twelfth line, for the word "may" substitute the word "shall." The section will then read as follows:

"At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all new applications received for membership or for transfer, which list shall be dated and shall contain a concise statement of the record of each applicant and the names of the references in the case of Corporate Member, and endorsers in the case of Associate, Junior or Fellow, with a request that members transmit to the Board any information in their possession which may affect the disposition of the applications. Not less than twenty days after the issue of such list, the Board of Direction shall consider these applications, together with any information in regard to the applicants that may have been received; may make further inquiries, if deemed expedient; shall classify the applicant with his consent, and on applications for Corporate Membership may direct a ballot."

THE PRESIDENT.—The matter is open for discussion, gentlemen.

J. F. O'ROURKE, M. Am. Soc. C. E.—I would like to offer this amendment as a substitute for the amendment just read.

The Secretary read the amendment offered, as follows:

Proposed Amendment to the Constitution.

Amend Article III of the Constitution as follows:

Strike out the first seven sections of Article III, and substitute the following:

1. Election to membership in all grades shall be by the Board of Direction, subject to the following procedure:

2. Honorary Members shall be proposed by at least ten members, and shall be elected only by a unanimous vote of the Board of Direction. A Past-President, or a member of the Board of Direction proposed for Honorary Membership, shall not be required to vote either for or against his own admission.

A person elected an Honorary Member shall be promptly notified thereof by letter. The election shall be canceled if an acceptance is not received within six months after the mailing of such notice.

3. Members, Associate Members, Associates, Juniors and Fellows, shall be elected by letter-ballot of the Board of Direction, and on such ballot three negative votes shall exclude.

4. An applicant for admission to the Society as Member or as Associate Member, or for transfer from any other grade to either grade of Corporate Membership, shall embody a concise statement, with dates, of the candidate's professional training and experience, and shall be in a form and in such detail as may be prescribed by the Board of Direction. It shall be signed by the applicant, and shall contain a promise to conform to the requirements of membership, if elected. The applicant shall furnish the names of at least five Corporate Members to whom he is personally known. Each of these shall be requested by the Secretary to address a letter to the Board of Direction, on a form prescribed by said Board, stating the extent of the writer's personal knowledge of the applicant and of his professional work. If at least five of the Corporate Members named as references do not furnish the requisite endorsement, the Secretary shall call upon the applicant for additional names, and not until written communications shall have been received from at least five Corporate Members shall the application be considered by the Board.

Applications of engineers not resident in North America, and who may be so situated as not to be personally known to five Corporate Members, may be endorsed by five Members of the Board of Direction, after having secured evidence sufficient, in their opinion, to show that the applicant is worthy of admission.

5. An application for admission as Associate, Junior, or Fellow, shall embody a statement of the applicant's qualifications for the grade of membership for which admission is sought. The application shall be signed by the applicant, and endorsed by at least three Corporate Members who shall certify that they personally know the applicant, and believe him to be in all respects a proper person to be admitted to the Society, and that they recommend him for admission.

6. At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all applications received, which list shall be dated and shall contain a concise statement of the record of each applicant and the names of his references in the case of Corporate Member, and endorsers in the case of Associate, Junior or Fellow, with a request that members transmit to the Board any information in their possession which may affect the disposition of the applications. The names of applicants for admission as Member or Associate Member shall be

Discussion on Amendment to the Constitution (Continued).

alphabetically arranged as applicants for Corporate Membership, without specification as to which of these grades is sought. Not less than twenty days after the issue of such list, the Board of Direction shall consider these applications, together with any information in regard to the applicants that may have been received, and may then proceed to letter-ballot. The Society shall be notified of all elections.

Change the numbers of Sections 8, 9, 10 and 11 to 7, 8, 9 and 10, respectively.

B. R. Green, M. Am. Soc. C. E.—I second the amendment.

The President.—This amendment has been offered and seconded, and is now open for discussion or action by the meeting.

A Member.—Is it the intention of taking the vote on the amendment to the Constitution, or the amendment to the amendment, to-day?

The President.—The amendment to this proposed amendment is pending.

A Member.—As an amendment to the Constitution?

The Secretary.—It requires a letter-ballot of the whole Society; action by this meeting is merely on the form in which the amendment shall be sent out.

P. C. Ricketts, M. Am. Soc. C. E.—Mr. Chairman, it seems to me that the adoption of this amendment to the original amendment would be the defeat of the original amendment. This question of the election of members by the Board of Direction has been thoroughly considered in the past two or three years. There was a committee, as you recollect, appointed, and that committee reported, and it was defeated, as I remember, by the Society.

Now, it seems to me that the amendment proposed to-day is a good one, that is, that the classification shall be made by the Board of Direction; but the amendment to this amendment is not, in my opinion, a good one. I do not believe that the Board of Direction should have the entire charge of the affairs of the Society. I believe that, as far as the election of members of the Society is concerned, the Society is the best judge. It is true that every now and then a pink ballot comes out. They look very pink and they make an impression, but the committee appointed found—I forget the exact number, but I think it was something like thirty-two pink ballots in four or five years. It seems to me that the present method of electing members is a pretty good method and a pretty safe method. We all have a chance, those of us who are interested, to scan carefully the blue lists as they come out, and afterward the ballots, and can use our own judgment; and it is a pretty good, democratic way of doing things.

I think it would be a mistake to adopt this amendment to the amendment proposed.

H. G. Prout, M. Am. Soc. C. E.—Mr. President, as the Chairman of the committee which originally produced the amendment which has been circulated among you, it may be well for me to say two or three words. The intention of the work of our committee was simply to put the classification in the hands of the Board of Direction, as Professor Ricketts has pointed out. That is all we wished to do. We held that the Board of Direction had that power already, under the Constitution, but it did not seem quite clear that that was the case, and, therefore, the amendment which we proposed was designed to make that clear; that it was not only within the power of the Board of Direction to classify candidates, but that it was their duty. That is what our amendment was aimed to accomplish.

The amendment to that amendment which is brought forward now accomplishes that purpose, and it goes further, and puts the election in the hands of the Board of Direction. So far as that goes, I do not agree with Professor Ricketts. For many years I have held very stoutly the position that he has taken, namely, that the election should be in the great body of the Society, but within the last two or three years my feeling has changed, and I have come to believe that it would be better for the Society if the election of members were in the hands of the Directors. I should imagine that it would increase the sense of responsibility of every person who was directly interested in the election; that is to say, each member of the Board of Direction would feel that the responsibility was upon him of doing precisely the right thing. He could not soothe his conscience by knowing that there is another body to come after him, to confirm or reject his action, and surely the Board of Direction can know more precisely the fitness or unfitness of the candidate than can the great body of the members.

It is extremely difficult, I know, to get to a large body precise information very quickly, and especially negative information; but that need not be so. The Board of Direction can organize its machinery in such a way as to get more precise information, we will say, by appointing some committees among its own members to cover different territories, and take pains to get information about candidates; and my own feeling now is quite strong that the Society would get better results by having the election put in the hands of the Board of Direction.

Foster Crowell, M. Am. Soc. C. E.—Mr. Chairman, I would also support the amendment to the amendment. The matter has been before the Society quite frequently, as one of the previous speakers has mentioned, and it seems to me that this presentation is an evidence of profound reflection upon the discussions that have gone before.

Having had the opportunity to support the general idea of the policy of the election of members by the Board, in the past, I have had my feelings confirmed that that is the most practical, exact and proper method of selecting the proper material. It is not my inten-

Discussion on Amendment to the Constitution (Continued).

tion to go into details at this time, but to point out that, with the present arrangement, when the pink ballot is sent out, there is always a strong effort, on the part of the friends of the candidate, to secure favorable action, upon the mere statement of their belief that the candidate is worthy. That has the effect of making the pink ballot entirely ineffectual, and there is no other reason that I can see—if you admit that the pink ballot is, to that extent, valueless—for keeping the election of members in the hands of the members of the Society, as at present.

On the other hand, the opportunity which the Board has of arriving at an accurate estimate of the candidate's character and abilities is so very much greater that it seems to me there is no choice in the matter, and I hope that the amendment will pass

Mr. Ricketts.—Mr. Chairman, Mr. Crowell has stated one view of the question. The other view is this: That a great many members of the Society will not write or give their opinions of the candidates to the Board of Direction, partly because they would be unable, perhaps, to prove definitely their opinions of the man, and, secondly, because they are afraid that members of the Board of Direction would give to the candidates information which had been presented to the Board of Direction.

Now, gentlemen, that thing occurs. Within my knowledge, there has been, within the last two years, a man presented for membership in this Society who was unfit for the position. He was first sent out by the Board of Direction to be voted upon, and was blackballed. He was then sent out again on a pink ballot, and was defeated. He was not a fit member of the Society. He would have been elected, if the election had been in the hands of the Board. They sent it out twice, and the members would not receive him.

Now, that is the other side of that question. And I also know, of my own knowledge, that members of the Board have given information to candidates for membership in this Society—information which they had no right to give. Now, that is the other side of this question. I do not mean to cast any reflections on the Board of Direction of this Society, as a whole. I have been a member of the Board, and I am proud of it, and I do not believe there are any better men in any profession who could be collected together than the members of the Board of Direction of this Society; but I do not believe they give often sufficient consideration, as a Board, to the question; and I do not believe that a man in California, if a pink ballot is sent to him, will give very much more consideration to it than he does at present. I think it is a perfectly safe proposition to leave that matter in the hands of the members of the Society as a whole. (Applause.)

Mr. O'Rourke.—Mr. Chairman, I have been a member of the

Society for nineteen years, and I have just completed a term as a Director. During my term in the Board, when Professor Ricketts was there, I nearly always had the pleasure of being on the same side with him, and I am sorry to see that, having left the Board, he does not continue on the right side of the question.

THE PRESIDENT.—I am informed that it is twelve o'clock, and this is the hour at which the ballot is closed and counted by the tellers.

MR. O'ROURKE.—The speaker's objection seems to be largely due to the fact that the Board of Direction is a fallible body, and that, to some extent, the door is ajar, and now and then information will get out. Well, that may be true; I don't know but what it has gotten out. I can only say that, in regard to the general practice, everything that goes to the Board remains there and never gets beyond. It may be that there are individual instances where that has occurred; that will happen anywhere, and when we can get enough sense together to make a Board of Direction that is infallible and all-wise, then the Professor's idea probably will be reached in regard to what a Board ought to be ; but as long as we cannot get any further than to select from among the body of the American Society of Civil Engineers the best men that are found in it, and make them the Board of Direction, we have got to put up with whatever difficulties may arise from the fact that they are not absolutely perfect.

Now, to get to the regular question: We are not discussing something that is proposed by the American Society of Civil Engineers as a new policy of the Society and a new way of electing its membership, and of being democratic or not being democratic—get away from that idea of democracy which seems to be so popular with some, and with all of us, I hope—but the only thing is we have got to find out how democratic we are. There is no body, of the description of this Society, which asks the general membership to elect its members.

This Society is probably six times larger than it was when I came into it, and the difficulty at that time was that the members were unable to vote intelligently, and that a few would get together, and, from prejudice, or for some other reason, shut out a man who was absolutely worthy. In spite of everything, the Society has grown, so that to-day, not to be a member of the Society, or to be rejected by the Society, by seven unknown voters out of two thousand, who may or may not be acting right, is a stigma; and the reason why people are rejected, very often, is not that they are unworthy, but simply because there are certain people who do not like them; and the more a man is known, while there are more people who like him, no matter how many may like him, they do not make any difference if there are seven who do not like him, however unworthy their motives, or however worthy, if you will, the other two thousand may be, their approval is of no value whatever.

Discussion on Amendment to the Constitution (Continued).

A MEMBER.—You would not get in now.

MR. O'ROURKE.—No, I would not have the least chance. One of the things that I would like to call attention to, in this amendment, is that it is a letter-ballot of the whole Board, and that three votes against any member reject. Now, that lets out all this thing about, "if the Board of Directors had the voice when this unworthy person was turned down in the pink ballot, he would have got in." It does not follow. There might have been three men on that Board who had sense enough to turn down a man asking to come in. That is not asking too much from this fallible Board which is not perfect. We may get three just men there. Who can tell?

What can be more ridiculous, Mr. Chairman, and Gentlemen, than to stand here and say that it is a democratic method that we have now, and that it ought to be kept up in spite of the fact that the experience of every other body, and our own experience, proves that it is wrong. Who votes and has a voice in favor of anybody? No, you can go to the Board of Direction with your troubles, if you have them, in regard to candidates, and the Board will carefully consider whether your troubles are real or not. You can go to your six bosom friends and say you do not like somebody, and he is rejected; and the Society stands helplessly by and sees him shut out. You can send out your pink ballots, and what do you get? You get ten or fifteen people who vote against every pink ballot, and then you get the great body voting on the pink ballot when they don't vote on the white ballot, and they don't vote on the pink ballot unless a special effort is made to bring out the vote.

I remember when the discussion was had, about ten years ago, on this pink ballot. It was supposed that when a wrong was done, everybody would be eager to right it. It has come to be so that not one-tenth of the members vote now for anyone; and the pink ballots don't have anything to do with it. They say: "We don't know." The result is that unless efforts are made to bring out the votes, less than 10% of the body votes, and 10% of that rejects. So, after all, with the pink ballot, unless you make an effort, 1% is a matter of rejection.

This thing of mistrusting your Board, and to have that mistrust expressed by a man who himself has been a member of the Board, and knows the absolute slavery of the membership of being a member of the Committee on Admissions—I never saw anything like it, gentlemen. I have never seen anything like the way in which the letters are weighed, and the evidence is taken against anybody. Unless there is the strongest appearance of injustice, and unfairness, and want of truth, in the objections that are raised against a man, the policy of that Committee on Admissions—and I have seen that Committee changed through three years—its policy is always to give the Society the benefit of the doubt against a man. In other words, the Society will keep every one out who cannot prove his title clear, as far as the Board of Direction is concerned. How is it with the outside parties? The people who waste two cents on a white ballot that does not contain a blackball are simply *nil;* and most of them know it.

Now, take any body: Does the Institution of Civil Engineers elect its members through the general body? Do any of the large clubs do it? Do any of the small clubs, even, do it, without making trouble for themselves?

The only way you can consider a man justly, in view of the rights that every engineer professionally qualified has to membership in the Society, whether we like him or not, if he is worthy otherwise, that can be protected by the Board of Direction, and it cannot be protected by putting it into the power of any seven—sellers of material, who, to get an order, any old thing at all does for an excuse to keep a man out, so long as they don't have to stand behind it, and I say seven will answer. I say it is the opposite of democracy; it is the opportunity for unfairness, and it is the opportunity for sneakery. (Applause.)

Mr. Green.—Mr. President, may I ask how the Board of Direction determines its action as to the sending out of either the white or the pink ballot. Isn't it done by a majority of the Board, the majority action of the Board? How many votes in the Board are sufficient to prevent the sending out of a pink ballot, or what is the action?

The Secretary.—It depends upon the number of members present at a meeting.

Mr. Green.—And the majority of those?

The Secretary.—The majority of those. I might say that the difference, if you will allow me a minute, the difference between the action of the Board under this proposed amendment, as I understand it, and the present action of the Board, in the case of applicants for membership, is that the action is taken at a meeting now where five members constitute a quorum, and by a majority; whereas, under the amendment, this is by a letter-ballot of the whole body, as I understand the amendment.

Mr. Green.—I am asking how the Board now decides ballots; I think it is done by a majority of the Board.

The Secretary.—Not a majority of the Board, but a majority of those present.

Mr. Green.—By a majority of those present. Then I would say to Professor Ricketts that it might be very likely that the Board, in sending out either the white or the pink ballot, may have voted unanimously on it, and that if a minority, or at least a sufficient minority in that Board, which, under the proposed amendment to the amendment, say, three votes, had existed, that white ballot would not have gone out in the first place, and probably the pink ballot would.

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The point I make is that, under the proposed amendment to the amendment, a small number of negative votes in the Board will defeat any candidate. That is not possible now. A small number of votes, under this proposition, would defeat any candidate, would it not?

THE SECRETARY.—Yes, sir.

MR. GREEN.—That would be a minority of the Board, if seven members were present. I was a member of the Committee, last year, which reported against the proposed amendment of this kind. I was the one minority member. It would, perhaps, be interesting for the Society to know that that Committee never held a personal meeting. There was but one other member upon the Committee with whom I was personally acquainted. The way we came to make the report was through a very little correspondence, and I did feel that some of my colleagues might not have had the opportunity to familiarize themselves with this question, as they would have had if we had got together and talked it over.

I believe that this proposed amendment is a most excellent thing, on general principles. Both Mr. Prout and the proposer of the amendment have stated my views of the thing very fairly. It is not a very important question, as far as the expense is concerned, but it seems to me that the Board of Direction has practically and entirely the whole thing in its own hands now, and when the majority of that Board decides to send out a letter-ballot, let it go out, and the members of the Society vote on it with what little light they have, which is very little, usually; and when they decide to send out the pink ballot, it is the same way; they have come to the best conclusion they can, by the majority, and then they have to throw the whole thing over to the Society to be acted upon with but very little knowledge, and very few votes come in. It seems to me to be a very clumsy arrangement, and that it would simplify matters very much, and be much to the advantage of the Society if the Board should attend to the whole matter. It would feel the responsibility more keenly. It can act upon the nominations for membership most intelligently, and it will not be obliged to throw anything upon the Society when unable to conclude the matter in a Board meeting unanimously.

GEORGE HILL, M. Am. Soc. C. E.—Mr. Chairman, there has been one criticism made which, in my experience, is not well founded. I know that, in my own experience, in obtaining admission to the Society, opposition was met which never dared show its head, and that opposition was kept up among the membership. It was simply a matter of personal prejudice, and was finally overcome. I have had other members of the Society request me to vote against members for admission, for reasons which I am very sure those men would not put on paper, and sign with their own names and submit to the Board of Direction; that is to say, for purely personal reasons in no way connected either with the personal fitness of the candidate to be a member of the Society, or with his professional qualifications.

The Board of Direction will occupy the position of a jury, and will waive all good reasons against the promotion or the admission of a candidate. They are best fitted to perform that function, because membership in this Society is not and should not be gauged by the man's personal acceptability to the various members of the Society, but by his professional qualifications, and his personal cleanliness. This is not a social club, where those who are in it are to determine upon the availability of those who are to come in, according to their personal acceptability, but it is a Society, as has been stated, where the only qualifications are personal cleanliness and professional standing, and for that reason the personal element ought to be eliminated as far as possible.

This proposed amendment is nothing more than the logical development of the method of admitting members to the Society, which has been a matter of slow growth, year by year, modified from time to time, in order to meet the conditions as they arise. It has now reached the point where it should be the belief of every thinking member of the Society that the change is an absolute necessity in order to secure the best work of the Society for itself.

In regard to the action by the Board on the application of candidates, I know, of my own knowledge, that the Board does give consideration to the voice of the members. I know of a case where an applicant whose name was sent out on the blue list never got any further. What the action of the Board was, I don't know. I do know that I wrote out what I thought of that candidate, signing my name to it, and sent it to the Board, and I know that the name did not go out to the voters. Whether that was backed up by anybody else or not, I don't know. My objection to that man was simply on his professional qualifications.

At 12.15 P. M. Past-President J. James R. Croes took the chair.

Robert Moore, President, Am. Soc. C. E.—Mr. Chairman, I cannot let a matter of this importance pass without having another proposition which has been made, in this regard, brought at least to the attention of the meeting. The matter itself is one of the very greatest importance. The method of selecting our membership is certainly one that cannot be exceeded in importance by any subject that can be brought before this body.

The present method, while, in the main, it has worked satisfactorily, I think, has not worked satisfactorily in all cases. There have been, undoubtedly, malicious and unjustifiable exclusions from the Society. I have not the experience that many of those who have served practically upon the Committee of Admissions have had, but I know that this is the fact. Now, the remedy for that, which is suggested

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by this amendment to the amendment, is to revolutionize completely the former plan, and to throw the whole matter into the power of the Board of Direction.

Now, there is another suggestion which, I think, was made to this meeting a year ago, which, so far as I know, was first brought before a meeting of the local members of the American Society of Civil Engineers at St. Louis, which was to solve the difficulty, not by throwing the election into the Board of Direction, but by increasing the number of negative votes required. Now, in a membership as large as ours, I think it may be admitted that seven votes, which is but a fraction of 1% of the total number of Corporate Members, is too small a number, and that it needs to be remedied in some way, and the suggestion at that time—and I think it is a suggestion which has been canvassed in the Board of Direction—was that the number be increased to approximately 1% of the total number of Corporate Members, which, at the present time, would be twenty or twenty-one.

Now, I think a great many members, perhaps not as well informed as some others, would prefer a method of that kind to one which is so entirely revolutionary as the one which has been suggested by Mr. O'Rourke's amendment, and I think that this plan ought to be brought to the attention of this meeting. This matter was considered by a Committee of the Board of Direction, I believe not approved by the Board of Direction, but a report was made which substantially embodies that idea, and, personally, it seems to me that it would be probably the best action to take at the present time. It seems to me that it would probably cure nine-tenths, if not the whole, of the malicious blackballing, which is now complained of, and which is sought to be remedied, and if so, it would, I think, be a safer remedy, and one which would greatly relieve the Board of Direction of the responsibility, which they certainly are not anxious to take, of bearing the whole burden of the election of members to the Society.

The gist of this proposed other plan is contained in this clause:

"The ballots shall be letter-ballots, in a form to be prescribed by the Board of Direction. They shall be mailed to each Corporate Member whose address is known, and shall state the date on which the ballot is to be canvassed, and which shall be not less than twenty days after the issue of the ballot. Twenty or more negative votes shall exclude from election."

If that twenty were made 1% of the Corporate Members, as at the time being, or at the time of the last list of membership, I think that it would go a long way toward curing the trouble which is now sought to be remedied.

Mr. O'Rourke.—Mr. Chairman, in relation to what Mr. Moore has just read, the report of that committee was made to the Board of Direction, and the reasons given by the committee were much the same as those given now by Mr. Moore for making that report. It was not that they considered it the best action, but they considered it the action that would be most likely to meet the difficulty, and at the same time meet with the approval of the general body and of this meeting. In other words, they believed that what my amendment to the amendment embodies was the best. It was passed upon by the Board, and approved by the Board as a substitute for this action of their own committee, and, as I am no longer a member of the Board, it was thought that it would be perfect good taste in having it presented by me, not as being the action of the Board, but it was their belief that it was the proper thing to do.

Mr. Moore, himself, states that it is not the best thing to do, this election of members by an uninformed body, as it is absolutely impossible to inform that body as to the qualifications of anybody, and right was considered as something; but they had this belief, which I do not believe, even though this meeting votes against this amendment.

My belief is that the Society wants to do what is right, even when it is radical, and the right thing to do is what every other Society does, elect your members by a body which is qualified to do it, by the knowledge which is brought to them, and by the knowledge which they themselves possess, and that is why this suggestion cannot be considered; for, of course, we cannot consider an amendment to an amendment, because you have either to accept or reject that amendment to the original amendment proposed as it is offered, and if you don't want to do anything radical, and rather prefer to do something which is half right and partly radical, why it is up to you to do it that way. (Applause.)

C. F. Allen, M. Am. Soc. C. E.—It seems to me that the gentleman who has proposed the amendment to the amendment has come near proving too much. He rather protests that the Board of Direction ought to be trusted. Why doesn't he protest that the Society ought to be trusted? Why can't you trust the Society as well as trust the Board of Direction?

I believe you can, but the objection is urged that there are some bad members in the Society. How did they get there? They went by the Board of Direction, if they got there at all.

Now, there is no way of doing this thing right. There is no way of handling it, so far as I can see, in which the action will be satisfactory. If you entrust it to the Board of Direction, the work will not be efficiently done. Men will go by who ought not to go by. If you entrust it to the Society, men will be rejected who ought not to be rejected. There is no escape from those propositions, it seems to me.

Not many years ago, in talking upon this particular matter, I talked with a member of the Society who had been in the Board of Direction, the Chairman of the Board of Direction—a man in high

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esteem in the Society—and his criticism was that it was undesirable that the matter should be thrown into the Board of Direction; that, in his experience, the action of the Board of Direction at times had been such that it was unwise to put the whole matter into its hands. It certainly is true that cases, as he suggested, had gone by, had gone through the Board of Direction, that ought not to. Certainly, members have been at first rejected, and have been again rejected, when they ought not to have been rejected.

We then, substantially, meet the proposition, what shall we do? Shall we take the chance of shutting out a good man, or shall we take the chance of letting in a bad man? I believe that we want to resist the chance of taking in the bad man. I believe that it is a mistake, on the whole, to take the affair out of the hands of the members.

It is perfectly true, as one of the previous speakers has stated, that I, or other members, may be entirely satisfied, but it may be absolutely impossible for us to prove, that he is an undesirable member, and yet our instincts are so clear and right, upon the best motives, upon the best qualifications for membership, that the ballots ought to be cast against the candidate.

It is said that seven bad members may cause the rejection of a good candidate. Why can't five members, who are the only members who know an applicant—five bad members—why can't they put the man into the Society? Where does the Board of Direction get its information, except from those five men?

There are a good many sides to it, I believe, and we want to hesitate before we take the power from the hands of the individual members, who, locally, are able oftentimes to have facts, which are the proper thing as the basis of admission—some of the people, locally, may have facts that do not really come to the Board of Direction. The Board of Direction has a good deal to do; they are busy men; they are not able always to get at the facts definitely. (Applause.)

J. N. **Greene**, M. Am. Soc. C. E.—Mr. Chairman, I want to ask Mr. O'Rourke, as a matter of information, how the Board of Direction gets information and knowledge as to candidates for this Society, and gets information which definite enough, and positive enough, to settle this question whether a man shall be admitted or not?

Now, I cannot see, from the debate, as far as it has gone, any plan, and I ask Mr. O'Rourke, in having been a member, what is the *modus operandi* at present, if any, which is taken to find out the qualifications of a candidate when he asks to be admitted to this Society?

Mr. O'Rourke.—Mr. Chairman, the *modus operandi*, so to speak, is to send out a blue list, notifying the whole body of the Society of the application of the person for membership, and requesting confidential information. That is done to-day. That information goes to the Committee on Admissions, and I have known cases where four men, and often more, were turned down by the Committee on Admissions at a single meeting, due to the evidence that was received as to the unworthiness of the applicant; and, further, if information is received against anybody which does not bear the stamp of truth on it, the Committee on Admissions, though they are busy men, go further into the matter. The name is put back, and put back, and put back, until they are fully satisfied. They take cognizance of the right of the good man to come in, as well as the right of the Society to exclude the bad, and that is something that cannot be done by the body at large, and that is something that it does not do to-day. It does not vote; it does not consider. Only those who have anything to say against anybody—and their saying is merely a black mark—those are the ones who really communicate anything to the election, and, further, Mr. Chairman, that is considered afterward by the Board.

Now, in the discussion, the point seems to be missed that, while to-day a majority of those present, voting in favor of a thing, will carry, though they may not be a majority of the whole Board, this amendment provides that all the information—of course, that is in the Board itself, to give information to the members—the Board as a whole will have to vote on every name that is brought up, and three members of the Board will be sufficient to exclude, voting in the negative.

MR. GREENE.—I was quite aware of the blue list and of the manner of sending it out, but what I want to get at is, if there is anything in the Board of Direction, aside from what Mr. O'Rourke has just stated, that would enable the Board to decide this question any more accurately or justly than it is being decided in this, it seems to me, too loose way we have now. Is there any other?

MR. O'ROURKE.—They take whatever evidence they get. It is up to the members to furnish the Board with objections, and that is done all the time. It is a great mistake to think that every name that goes out on the blue list comes out on the white list afterward—it is far from that.

MR. GREENE.—It seems to me to be evident to every member of the Society that it is a very embarrassing thing, and a very difficult thing, for him to take a blue list, about which he may know something, or little, or much, or, perhaps, not anything, and he hesitates before he discriminates against a man and sends information to the Board, unless he has positive knowledge. It would not be fair for him to do it unless he had.

Now, it seems to me, the difficulty in this matter is that this thing is not concentrated in any workable, proper manner. It seems to me that there ought to be a committee of this Board of Direction whose business it shall be, confidentially, to ascertain the facts, and whose business it shall be to keep everything of that kind that they get into

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their possession positively and absolutely to themselves, and not as the gentleman over there has described, that he has known of cases where the Directors have given out information by which men were rejected, which is a very unjust thing, as we all agree.

Now, this matter of getting into this Society as a member should not be looked upon as so small a thing as not to attract anybody's attention. It is a great thing to be a member of this Society, if men would only look at it that way.

Now, what is our position in this matter? We are entrusted, more than any other body of men on this continent, with the expenditure of capital for the improvement of the public works of this country and the country's general good, and we are called upon, and should be held right up to the mark, that we make good that expectation of the public, because the man who takes a position as an engineer and disburses millions of money should be, beyond any question, rock-bound in his integrity, and naturally he should be well advised, well educated by experience, and show his ability to cope with the subjects that may come before him.

I make the statement here, and I believe it is true, that, for two reasons, more money has been wasted on the public works of this country in the last fifty years than it would take to pay the public debt of this country when our Civil War closed. What are those two reasons? They are very lucid, and very short, and very nubby. First, the brains and ability and knowledge of the business that the man who has the matter in hand, whether he is able to cope with it and do it properly, and the next is, whether he has got such integrity at rock-bottom that he will do justice between the parties, let what will come.

Now, we know that men have got into such positions in this country; for instance, this matter in Savannah, a few years ago, by a United States officer, educated, I believe, at West Point, and now serving time, in a western penitentiary, for stealing. There was a man, educated at his country's expense, and it seems to me the only mistake that was made in that man's case was that he had not gone to State's Prison before he went to West Point; then he could not have done this mischief.

There ought to be some way in which this Society can exact from the candidates who want to come into it facts and information sufficient to give the Board of Direction—or whoever is left to decide this question of who shall come in and who shall stay out—absolute knowledge enough so that they will feel that, conscientiously, they are safe in letting a man in, or they are acting exactly as honestly in saying that he cannot come in.

It seems to me, Mr. Chairman, that something of that kind should be done in the Board of Direction, if this amendment passes. Now, what is everybody's business is nobody's business, is an old saw—

older than any of us here—and if this amendment be passed, and the Board then appoints a sub-committee whose duty it shall be to do that, and make it their business to see to it, it seems to me that this question, and this trouble, will be largely removed, and very easily; but I do not see how it ever can be done, in the *modus* under which we are now proceeding.

Mr. Ricketts.—Mr. Chairman, I would like to ask a question. It is assumed that members of the Board of Direction who may reside in California are to vote intelligently on each application. Suppose a member shows a letter to the Board in which he says that he knows or believes that a certain applicant is a blackguard and a rascal, do I understand that, under this amendment, the Board intends to print that, and send it out through the United States mails to the different members of the Board throughout the United States? And, if they don't do that, how can the various members of the Board, distributed throughout the United States, vote intelligently in any case?

Mr. O'Rourke.—The best answer to that, Mr. Chairman, is to state what is the practice at present in the Board. All such communications, and all preliminary considerations of an applicant, are considered by a committee similar to the committee that Mr. Greene has spoken of, who take all these facts into consideration, and when the name comes before the Board they recommend either that he be accepted or rejected. Usually, the rejection follows in any case. I have never known of a name to go by that committee, so that, even if the Board was present, and even if they had this stuff piled up there in a basket before them, they would never even ask for it, or ask to see it, if the Committee's report on the man who is not favored by them is presented; I have never known of a case that it was not so considered by the action of the Board. There may be a few instances, of course, but I am probably proceeding too far; but I am talking about the general practice. The confidence of the Board in this Committee is so great that they rarely go beyond that, if there is any reason to believe that he is not worthy. No matter what would be the proceeding under this amendment, I would say that whenever any real occasion arose for communicating to everybody on the Board, means will be found to do it. I think we can trust the Board for that.

There is no doubt about it that the only way you can sift a thing like that is to sift it through a committee, and once your committee has given its conclusions on the matter, if you want to go behind the committee, then it is time to go about it.

Mr. Ricketts.—In other words, this local committee, which must necessarily be a local committee, is to determine who shall be members and who shall not be members of the Society. (Applause.)

E. P. **North**, M. Am. Soc. C. E.—Mr. President, I listened with a great deal of pleasure to Mr. O'Rourke's description of the proceedings before the Committee on Admissions. It does not quite agree with a

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little bit of experience I had, I think before Mr. Ricketts was a member of the Board.

I saw in the blue list the name of an applicant who, I thought, was unfit for membership. I wrote to the Board of Direction that, before his name was passed to ballot, I might be further communicated with, as I would like to make a personal communication. The next month the name came out on the ballot list. I inquired about the thing, and, while I cannot make any official statement, I think I am justified in mentioning my suspicion that the name was examined, one among over sixty, on a very hot September Tuesday, and the fact was that they did not get to my letter at all, but passed the man among that number, as I take it.

Now, that is an extreme case, I am perfectly willing to admit, and I wish to urge that it is an extreme case; but I wish to say to the members of this Society that if this proposed change in the Constitution is made, one provision against the admission of unworthy members is swept away. It does not make much difference to the older men in the profession what reputation a young man has, but a young man who is looking for a place, and says he is a member of the American Society of Civil Engineers, is very severely handicapped by the knowledge that another member of the Society is unworthy of the name, either of a civil engineer or a man. (Applause.)

G. F. Swain, M. Am. Soc. C. E.—Mr. Chairman, I am heartily in favor of Mr. O'Rourke's amendment. I hope it will be adopted. I believe in concentrating responsibility, and I do not know of any better place to concentrate responsibility than upon the Board of Direction of this Society. It is the way that every large corporation does business; it is the way that a great many of the large clubs, if not all of them, and many of the professional societies elect members.

I think that we might trust the Society, as Professor Allen suggests, if the Society had information, and if the Society, and every member of the Society, or every seven members of the Society, would act squarely. I do not believe in giving seven members of the Society an opportunity to stab a man in the back for personal reasons. If there are seven members of the Society who think that a man ought not to be admitted, they certainly can bring information enough into the possession of the Board of Direction to enable that Board to form a fair opinion of the justice of their reasons.

I think that it must not be lost sight of that the proposed amendment will change the present mode of procedure of the Board. Five members of the Board now constitute a quorum, I believe, and three, therefore, would enable a meeting of the Board to pass a candidate for ballot. That is the way in which, perhaps, some unworthy men have become elected, have been passed to ballot, as Professor Allen states.

The mode of procedure proposed by Mr. O'Rourke would require the Board of Direction to vote by letter-ballot. I do not see that there is any difficulty, as Mr. Ricketts seems to think, in getting information to the various members of the Board in regard to the unworthiness of certain candidates. If a member of this Society knows that a candidate is a blackguard, and writes to the Board, giving his information, it is just as easy to write to the various members of the Board and give them the facts. There is no difficulty about that.

Ibelieve in concentrating responsibility in the Board, and I think very likely the Board would modify, to some extent, its procedure. Responsibility always makes a man more careful. The Board is very careful now; I know from experience how much care is taken by the Board on the admission of candidates, and how carefully they consider every candidate. I cannot conceive at the present time of any letter from Mr. North not having been given great consideration. I don't know how it was. It was many years ago, perhaps ; but I know how it is at present, and I, therefore, am strongly in favor of the amendment of Mr. O'Rourke. (Applause.)

Mr. North.—I would like to ask, before the Professor sits down, definitely, if it is much better to allow three or five men to stab a man in the back than seven? It really comes to the Board of Direction, a smaller number of Directors than is required now, preventing absolutely a man's election. The Directors are taken from the main body of the Society, and I do not understand that they are much more reliable than those of us who are not Directors, and are fully as able to stab a man, I take it (laughter).

Mr. Green.—It is a great deal safer for the Society to reject a good man this year, if he can be admitted later, when more information about him can be secured than could be had in the first place, than it is to let an unqualified man come in. If there is anything at all of value to the members, or anything at all in membership in the Society, it should be the standing of its members as good engineers, and if an unworthy, unqualified man gets in, he is in there to stick, and you cannot get him out, but you can very easily put in a qualified man who has been passed over the first year for lack of information, or because someone wishes to stab him in the back, and elect him after a while.

I think the Board of Direction can be entirely trusted in this business, and if five members, only, constitute a quorum before the letter-ballot was sent out to all the members to vote upon the candidate, and it happens to be found that three out of those five vote against him on the spot because there is some question about the candidate, it is not necessary to send out the ballots to all the membership. It seems to me that we are straining at a gnat and swallowing a camel. Mr. Rickett's case has been entirely taken care of and disposed of in

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the particular way that it came up, if the minority who may have voted against the candidate at that time had been three in number.

I believe, as do many others, in holding up to a very high standard the candidates for membership in the Society. I think that too many men get in now who are lacking in the qualifications that they ought to have; they might wait a little while. A good many young fellows on reaching the age of thirty apply for membership and try to get in, but it is better for the Society that the Board of Direction should scrutinize these applications with considerable care, and, in my experience, it is safer for them to reject them, if necessary; and I say that it is a great deal better for the Society to reject, once in a while, a very well qualified man, a desirable man, than it is to make a mistake and elect an unqualified man.

(The President resumed the chair.)

T. S. White, M. Am. Soc. C. E.—I would like to ask the President one question in regard to the amendment that he spoke of and suggested a little while ago, as to increasing the number necessary to exclude. Have there ever been twenty negative votes cast against any member?

G. I. Bailey, M. Am. Soc. C. E.—Mr. President, in regard to this amendment to the amendment proposed by Mr. O'Rourke, I wish to say that I am opposed to it, and that several members of this Society, who do not live in New York, and whose associations in the Society are confined to receiving its publications, and the communications mailed from the Secretary's office, and an occasional blue list and ballots to members, are opposed to it.

If abuses have been made in the election of members to this Society, I think the thing to do is to get at those abuses and stop them. If you cannot expect the members to vote intelligently and properly for admittance of candidates to their own membership, I do not see how you can cure that evil by allowing those same members to vote for members of the Board of Direction, and then shifting that responsibility over to that Board.

I believe the suggestion made by yourself, or by some one before, that if a committee of seven in the Society may keep out members, then that number should be enlarged, and, as you say, a percentage of the whole membership of the Society, or else a percentage of the whole number of votes cast, should exclude. The pink ballot does correct that evil of seven, as has been demonstrated a number of times in the last few years, but for these up-country members, of whom I am one, we like to have something to say, occasionally, in regard to the Society, and feel perhaps like the Americans of a hundred and thirty years ago, when they had the little tea-party up around Boston. We are all taxed for the Society, we pay our dues, and we want something to say for it, and if we are not competent to pass upon our own members, I do not believe in appointing some nurse to do it for us; give us all a chance. (Cries of Question.)

The President.—The question is called for. The question is upon the amendment to the amendment offered by Mr. O'Rourke, which, I think, it is not necessary to read. Those who are in favor of the adoption of the amendment to the amendment proposed by Mr. O'Rourke will signify by saying aye; contrary, no.

The Chair is unable to decide.

G. S. **Morison**, Past-President, Am. Soc. C. E.—Before any further vote is taken, Mr. President, I should like to know what this amendment to the amendment is?

The President.—Well, it is an amendment which, in effect, throws the election of members wholly into the Board of Direction.

Mr. Morison.—May I ask to have that read?

The President.—The reading of that amendment is asked for, and I will ask the Secretary to read it.

(The Secretary read the amendment to the amendment.)

The President.—Having heard the amendment to the amendment, proposed by Mr. O'Rourke, all those who are in favor of it will signify by rising and standing until counted.

(The Secretary announced sixty-eight votes.)

Mr. Allen.—I rise to a point of order. I would like to know what the situation is as to those men who are standing, not from their seats, but behind the seats in the rear of the room; are those members properly counted in the room or not?

The Secretary.—I counted everybody standing in the room; not outside of the room.

The President.—Those who are opposed to the amendment will rise.

(The Secretary announced eighty-eight votes.)

The President.—The amendment is lost. The question now recurs upon the amendment as it was heretofore read, the amendment which you have received in print.

The Secretary.—Allow me to say, Mr. President, that this meeting can do nothing with that amendment except to amend it. Unless that proposed amendment is amended by this meeting, under the Constitution, it goes to letter-ballot of the Society.

The President.—The Secretary is correct. The proposed amendment having failed, the original amendment goes to the Society for letter-ballot. If there is no amendment offered to this, it will go out in the form in which it is. This is simply to the effect that the Board of Direction may classify; it has no bearing upon the number of negative votes that may be necessary to exclude.

Mr. Knap.—I wish to ask for information, now that that amendment has been voted down, is it in order to present another amendment?

Discussion on Amendment to the Constitution (Continued).

The President.—In the nature of an amendment to this; yes, sir.

Mr. Knap.—I am sorry I have not got it written down, but I would like to make an amendment to the amendment to this effect, that, in order to exclude, the number of negative votes should be 1% of the Corporate Membership at the last Annual Meeting, or at the time of the last Annual Report; 1%, which would be, as the President has stated before, about twenty at the present time. Instead of seven, I wish to substitute the number twenty.

The President.—That is, you wish to substitute 1 per cent.

Mr. Knap.—Twenty, or 1%, which will be at this time about twenty.

Mr. Swain.—I second the motion.

The President.—The amendment is seconded and is now before you, which amends Section 4 of Article III, making it 1% of the Corporate Membership.

The Secretary.—As of the 1st of January of each year?

The President.—Yes; necessary to exclude.

Mr. Knap.—I would state, in addition to that, that when the number seven was decided upon, as I understand it, there were about seven hundred members in the Society, and that was really about 1%, but twenty is now practically the same percentage of the Society as seven was at that time.

The President.—The amendment is now before you for discussion, gentlemen.

Allen Hazen, M. Am. Soc. C. E.—It seems to me that there may be a great many men proposed for membership of whom there would not be twenty men who know well enough about their position and standing to pass intelligently upon this point, and in that respect twenty to-day may be a much more liberal allowance than seven, which was 1% at the time it was adopted, if that were the case. And I question if twenty is not a larger number than we can afford to give at the present time, even if seven is too small. I am not one of those who feel that to be defeated by seven votes is anything to be ashamed of, or to feel unduly. There is a satisfaction in having gone through the pink ballot and feeling that the great majority of the members of the Society are behind you.

Mr. White.—Just in regard to that point that Mr. Hazen has made, the question arises again as to how many votes were ever cast against a man, and whether it is possible that anybody would ever be excluded if it required twenty votes to exclude him as a member.

The Secretary.—There have been twenty votes cast against a candidate, and there has also been one voter who has voted against all the candidates on a ballot list, on which I think there were forty-six.

Mr. Hill.—As I understand it, Mr. President, 1% of the Corporate Membership, according to the list as handed out to-day, is only about seventeen voters, and seventeen votes are considerably less than twenty. It seems to me that the real effect of this proposed amendment is to carry into effect by indirection the amendment which has just been voted down, because it seems to me that it would rarely happen that such a number of adverse votes would be cast. It seems to me that that is a very exceptional number. In this particular case the men who know objectionable characteristics on the part of the candidate, in order to make that objection effective, must vote through the Board of Direction, so that the effect will be, if we feel that a candidate is objectionable, we must go to the Board and stop him there, feeling certain that it will be difficult to get the requisite number of voters.

(Calls for the question.)

F. W. Hodgdon, M. Am. Soc. C. E.—Mr. Chairman, this question seems to be entirely out of order. The question of the number of negative votes which will come up is an entirely new question. It is not an amendment to the amendment which is to go before the Society at the present time. That simply refers to the application of the applicant. This is the method of election of the applicant, and should come in as an entirely new amendment and be presented to the meeting, and be presented to the Society for discussion. (Applause.)

(Calls for the question.)

Mr. Croes.—I think, Mr. President, that this is entirely germane to the amendment. This resolution making the change in the Constitution is offered, and this changes two or three words of it, and that is all.

Mr. Hodgdon.—Not germane to the subject, but to the other amendment.

Mr. Croes.—It changes two or three words in that; it makes it twenty instead of seven, that is all.

Mr. Hodgdon.—That question is not up in the amendment.

Mr. Croes.—The amendment is this amendment to the Constitution, and this is an amendment to that amendment, and it is perfectly proper.

(Calls for the Question.)

The President.—That raises a question which it is a little difficult for me to decide off-hand. Both are amendments to Article III, though not to the same section of Article III.

The Secretary.—The language of the Constitution is, that an amendment may be amended in any manner pertinent to the original amendment.

Mr. Hodgdon.—What section is it that it is proposed to be amended?

The President.—It is proposed in the original to amend Section 3, Article III.

Discussion on Amendment to the Constitution (Continued).

Mr. Hodgdon.—In relation to the proposed amendment to that, where we had the proposed amendment of Mr. O'Rourke, that came up, because it was proposed to amend Sections 2 and 3 of Article III; but the amendment proposed by Mr. Knap amends Section 4 of Article III. I just raise the point of order that it is not germane.

The President.—I think I shall have to decide that it is not in order.

Resolution in reference to the late Abram S. Hewitt.

Mr. Morison.— Mr. President, is there any other business to come immediately before the meeting? If not, I would like to offer a resolution. It has not been the custom of this Society to pass special resolutions in relation to special men, but it seems to me that the coincidence of this meeting in connection with the history of this city, and of the country, for a great many years, calls for some special action now.

Some of us were late in coming to this meeting to-day, and the reason for that was because we cared more about rendering the little respect we could to one whose memory the whole engineering profession has honored than for attending to the business here this morning, important though it be.

At precisely the same hour for which this meeting was called the last services were held over the man who, for a long time, we have looked upon as New York's first citizen, and who, if any man outside of the profession has ever done much for engineers, he has certainly done it. My own personal acquaintance with him began about thirty years ago, and for twenty years I have felt that, if there was any subject upon which I needed especially sound advice and help, he was the man for me to go to. I think there are many of us who have felt in that same way.

I therefore offer the following resolution:

Resolved, That the members of the American Society of Civil Engineers, assembled in their Annual Meeting at the hour when the last sacred rites were performed over the mortal remains of Abram S. Hewitt, desire to place on record a brief recognition of the debt which so many of them individually, and all of them as a profession, owe to him who was for so many years New York's first citizen.

While he always disclaimed being an engineer, he had the mind and spirit which mean more than the actual professional name. While not enrolled among their numbers, his whole life, as a citizen, a manufacturer and an educator, was devoted to those interests which have made the engineering profession possible.

Few cities have had so patriotic a citizen. No profession has had a warmer friend.

(Applause.)

R. W. Hunt. M. Am. Soc. C. E.—I desire the privilege of being a seconder to that resolution, and I think, sir, we all feel it fitting that this Society should pass such a resolution. While Mr. Hewitt was not a member of our own organization, he was a Past-President of a sister national society, and, surely, if ever a man served his country, and served his country in a way that was effective, it was he.

In looking at the progress of the world, the advancement of mankind, and those who have been connected with it, it is difficult to draw lines showing exactly where such a one's influence has extended and ended.

So, with Abram S. Hewitt, we cannot exactly mark out the great industrial advancement of the United States, or the progress, or the better condition of its citizens that was brought up to a certain point by him; but surely no man has lived in his generation who has done more to sweep on that tide. He has given and done the things that were best calculated for the true advancement and the true benefit of his fellow men, and now, sir, God has made the just man perfect. (Applause.)

The President.—Gentlemen, you have heard the resolution offered by Mr. Morison, and so ably seconded by Mr. Hunt. All in favor of its adoption will signify by rising.

It is a unanimous vote.

The Secretary.—I have the report of the tellers.

The President.—If there are no other resolutions to offer——

J. A. Ockerson, M. Am. Soc. C. E.—I would like to offer a resolution.

The President.—Well, that will be in order.

International Congress of Engineering.

Mr. Ockerson.—*Resolved,* That it is the sense of this meeting that the American Society of Civil Engineers should co-operate with the officers of the Louisiana Purchase Exposition Company, in the inauguration of an International Congress of Engineering, to be held in St. Louis, during the Exposition period of 1904, and be it further

Resolved, That the Board of Direction be, and is, hereby, authorized and requested to take such steps as may be necessary to carry out the provisions of the foregoing resolution.

I might say, gentlemen, in this connection, that the Exposition Company is making very generous provisions for the scientific congresses, and, of course, it is important that the American Society of Civil Engineers should take a leading part in the engineering congresses. For my own part, I should be very glad to have the Society make use of my department at the Exposition in any way possible to help this matter along. The use of stenographers, typewriters, and other members of the force is at your service.

The resolution was duly seconded.

The President.—Is there any further discussion upon it? I will ask for the vote. Those in favor of the adoption of the resolution, which you have just heard read, will signify by saying aye; those opposed no.

Carried.

The President.—If there are no further resolutions, the next order of business will be the report of the tellers.

Report of Tellers.

THE SECRETARY. The tellers' report is as follows :

Report of Tellers Appointed to Canvass the Ballot for the Election of Officers at the Annual Meeting, January 21st, 1903.

Mr. Chairman: Your Committee, appointed to canvass the ballot for Officers, reports as follows:

Total number of ballots received		710
Not entitled to vote	1	
Without signature	13	
Voted nominating blank	1	
	—	15
Counted and found correct		695

For President:

Alfred Noble	691
Edward A. Bond	1
F. W. Cappelen	1
Henry S. Haines	1

For Vice-Presidents:

L. F. G. Bouscaren	684
James D. Schuyler	687
O. F. Nichols	2
Wm. M. Black	1
Addison M. Scott	1
Howard G. Kelley	1
Thomas H. Johnson	1
D. C. Henny	1
W. H. Kennedy	1
W. F. Tye	1

For Treasurer:

Joseph M. Knap	693
Palmer C. Ricketts	1

For Directors:

Alfred Craven	686
Joseph O. Osgood	684
George S. Davison	676
E. C. Lewis	672
Hunter McDonald	679
Elwood Mead	671
C. E. Grunsky	3
J. M. Johnson	2
J. B. Lippincott	2
H. M. Wilson	2

David E. McComb	1
R. C. McCalla	1
Chas. H. Graham	1
B. S. Wathen	1
A. M. Scott	1
J. C. Guild	1
J. A. Ockerson	1
Jos. Ramsey, Jr.	1
Geo. S. Webster	1
Arthur L. Adams	1
D. C. Henny	1
W. H. Kennedy	1
Edward B. Taylor	1
Louis Y. Schermerhorn	1
F. A. Molitor	1
C. L. Harrison	1
D. W. Lum	1
James B. Atkinson	1

GEO. C. STODDARD,
C. D. POLLOCK,
Tellers.

JANUARY 21ST, 1903.

Remarks by Past-President Moore.

THE PRESIDENT.—Gentlemen, you have heard the report of the tellers, and with this election your present President retires. I cannot do so, however, without expressing to you and to the Society at large my thanks for the compliment which you have paid me in choosing me as your President, and further extending my congratulations to the Society upon the great prosperity which this Fiftieth Anniversary Meeting now witnesses; and when we see what we do see here before us, a large Society gathered in a house of its own, and compare it with the small beginning of the Society fifty years ago, I think we see that there has been planted here a very vigorous plant, and we may be sure that the next fifty years will witness a Society which will be of the utmost importance, not only to this profession, but to the whole country.

President Noble Introduced.

I will ask Mr. Morison and Mr. Croes to conduct the new President to the Chair.

ALFRED NOBLE, President, Am. Soc. C. E.—Gentlemen of the American Society of Civil Engineers: I appreciate very deeply the honor of the election to the Presidency of this Society, and this cordial greeting which you have been good enough to accord me. This Society is the best exponent of the profession of engineering on this hemisphere. Of the four great national societies, it is the one which seeks to embrace in its ranks all branches. Nine times in ten the engineer must stand or fall on the simple issue of the performance of duty. On this issue, I perceive, with some alarm, that I must hazard what I prize most highly, the continuance of the good opinion of my professional brethren. In return for the honor which you have been good enough to bestow on me, I can only promise to regard the responsibilities I am about to assume as commensurate with the honor they imply, and to discharge the duties which I gratefully assume to the best of my power. (Applause.)

Memorial Tree at Mount Vernon.

THE SECRETARY.—Mr. President, I have one letter which I omitted to read, and with your permission I will read it now.

ST. LOUIS, MO., JAN. 19, 1903.

MR. CHARLES WARREN HUNT,
Sec'y. Am. Soc. Civ. Engineers,
New York.

Dear Sir:

I hereby report to the Society that, in pursuance of the resolution passed at the last Annual Convention in Washington, I have had an oak tree planted at Mount Vernon, as a memorial of the visit of the Society in May last.

In the execution of this work, I have had the invaluable assistance of Mr. Gifford Pinchot and Mr. George B. Sudworth of the Bureau of of Forestry and Mr. Harrison H. Dodge, Superintendent of the Mount Vernon Estate, and the thanks of the Society are due to these gentlemen.

Yours very truly,
ROBT. MOORE,
President.

MR. MOORE.—I move that the Secretary be instructed by this meeting to extend the thanks of the Society to these gentlemen whom I have named. They have executed, with great skill and fidelity, this commission which was placed on them, and, I may say, without any cost to the Society. I think that the vote of thanks is due to them.

The motion was duly seconded and carried.

After several announcements by the Secretary as to features of the programme for the meeting, the meeting, on motion duly seconded, was adjourned.

EXCURSIONS AND ENTERTAINMENTS AT THE FIFTIETH ANNUAL MEETING.

Wednesday, January 21st, 1903.—After the business meeting, lunch for about 450 members was served at 1.30 P. M. in the Lounging Room. At 3 P. M. a large party, under the guidance of Alfred Craven, M. Am. Soc. C. E., Division Engineer, visited and inspected the tunnel of the Rapid Transit Railroad, between Sixtieth and Forty-second Streets. The station at Broadway and Sixtieth Street, and various portions of the tunnel were lighted for the occasion. Smaller parties visited other parts of the work, in Harlem, on Park Avenue, at the City Hall, etc., during the afternoon.

At 9 P. M. there was a Reception, with dancing, in the Society House, at which the total attendance was about 375.

Thursday, January 22d, 1903.—At 10 A. M. the steamer *Valley Girl* (kindly furnished for the occasion by John H. Starin, Esq., and General Howard Carroll) with about 400 members and guests, including many ladies, left the Recreation Pier at the foot of East Twenty-fourth Street for an excursion. By invitation of Hon. Gustav Lindenthal, M. Am. Soc. C. E., Commissioner of Bridges, the party visited the site of the Blackwell's Island Bridge (No. 4) and inspected the masonry piers, on Blackwell's Island and at Ravenswood, in course of construction. Lunch was served on the boat while on its way down the river, and a stop was made at Hoboken to inspect the new fire-proof piers which are being constructed by the North German Lloyds Steamship Company. The party was landed at the pier at the foot of West Thirty-fifth Street, New York, at about 5 P. M.

In the evening there was an informal "Smoker" at the Society House, about 400 members and guests being in attendance.

The following list contains the names of 396 members, of various grades, who registered as being in attendance at the Annual Meeting. This list is incomplete, on account of the failure of many members to register, and it does not include the names of any of the guests, of the Society or of individual members:

Abbot, F. W.	New York City
Abbott, E. L.	New York City
Aiken, W. A.	Pittsburg, Pa.
Allen, C. A.	Worcester, Mass.
Allen, W. A.	Maurer, N. J.
Ashbridge, R. I. D.	Philadelphia, Pa.
Atkins, H. B.	New York City
Auryansen, F.	New York City
Aus, G.	New York City
Bacon, J. W.	Danbury, Conn.
Bailey, G. I.	New York City
Baker, E. B.	Morgantown, W. Va.
Barnes, W. T.	Boston, Mass.
Bascom, H. F.	Allentown, Pa.
Basinger, J. G.	New York City
Belden, E. T.	Middletown, Conn.
Belknap, W. E.	New York City
Bellinger, L. F.	Brooklyn, N. Y.
Belzner, T.	New York City

Bensel, J. A.	New York City
Benton, L. S.	New York City
Benzenberg, G. H.	Milwaukee, Wis.
Berg, W. G.	New York City
Bettes, C. R.	Far Rockaway, N.Y.
Beugler, E. J.	Boston, Mass
Bishop, G. H.	Middletown, Conn.
Bissell, C. T.	New York City
Bissell, H.	Boston, Mass.
Boller, A. P.	New York City
Boller, A. P., Jr.	New York City
Bonzano, A.	Philadelphia, Pa.
Booth, W. F.	New York City
Bouscaren, G.	Cincinnati, Ohio
Bowman, A. L.	New York City
Bramwell, G. W.	New York City
Breuchaud, J.	New York City
Brinckerhoff, H. W.	New York City
Bryson, A.	Reading, Pa.
Buchholz, C. W.	New York City
Buck, H. R.	Hartford, Conn.
Buck, L. L.	New York City
Buck, R. S.	Montreal, Canada
Burdett, F. A.	New York City
Bush, E. W.	Hartford, Conn.
Butts, E. P.	Springfield, Mass.

Carney, E. J.	New York City
Carr, A.	New York City
Carter, A. E	New York City
Carter, Shirley	Norfolk, Va.
Cattell, W. A.	New York City
Chambers, R. H.	New York City
Chase, F. L.	New York City
Chester, J. N.	Pittsburg, Pa.
Christian, G. L.	New York City
Christie, G. B.	Chicago, Ill.
Clapp, O. F.	Providence, R. I.
Clark, G. H.	New York City
Clark, J. A., Jr.	East Orange, N. J.
Clark, L. V.	Philadelphia, Pa.
Clarke, St. John	Bogota, N. J.
Codwise, E. B.	Kingston, N. Y.
Cogswell, W. B.	Syracuse, N. Y.
Colby, S. K.	New York City
Collier, B. C.	New York City
Collingwood, F.	Elizabeth, N. J.
Conrow, H.	New York City
Cook, J. H.	Paterson, N. J.
Cooper, S. L.	Yonkers, N. Y.
Cooper, T.	New York City
Copeland, W. R.	Philadelphia, Pa.
Cornell, J. N. H.	New York City
Corthell, A. B.	New York City
Coverdale, W. H.	New York City
Crane, C. A.	New York City
Crane, F. E.	Amsterdam, N. Y.
Craven, A.	New York City
Crehore, W. W.	New York City
Creuzbaur, R. W.	New York City
Croes, J. J. R.	New York City
Crowell, F.	New York City
Cuddeback, A. W.	Paterson, N. J.
Cudworth, F. G.	New York City

Davies, J. V.	New York City
Davis, A. L.	New York City
Davis, Chas.	Allegheny, Pa.
Davis, R. B.	Boston, Mass.
Davison, G. S.	Pittsburg, Pa.
Dawley, E. P.	Providence, R. I.
Dean, L.	Taunton, Mass.
Deans, C. H.	New York City
Deans, J. S.	Phœnixville, Pa.
Devin, G.	New York City
De Witt, P. H.	New York City
Diebitsch, E.	New York City
Dorrance, W. T.	New York City
Dunham, H. F.	New York City

Easby, M. W.	Philadelphia, Pa.
Ehle, B.	East Creek, N. Y.
Ellis, J. W.	Woonsocket, R. I.
Erlandsen, O.	New York City
Evans, J. M.	Brooklyn, N. Y.
Evans, L. H.	New York City

Fernstrom, H.	New York City
Fisher, C.	Trenton, N. J.
Fisher, E. A.	Rochester, N. Y.

Fitch, C. L......Brooklyn, N. Y.
Francis, G. B.....New York City
Francis, H. N...Providence, R. I.
Frazee, J. H.......New York City
French, A. H....Brookline, Mass.
French, A. W...Worcester, Mass.
French, J. B......New York City
Frost, G. S.........New York City
Fuller, A. D.......Boston, Mass.
Fuller, F. L.......Boston, Mass.
Fuller, G. W......New York City
Fuller, W. B......New York City

Gartensteig, C.....New York City
Gifford, G. E .... New York City
Gillespie, R. H ...New York City
Goad, C. E ....Montreal, Canada
Goodnough, X. H..Boston, Mass.
Gould, E. S.......Yonkers, N. Y.
Gowen, C. S .... Ossining, N. Y.
Graham, C. H.....New York City
Grant, T. H.....Red Bank, N. J.
Green, B. R...Washington, D. C.
Greene, F. S......New York City
Greene, J. N.......Boston, Mass.
Gregory, C. E.....New York City
Gregory, J. H....Paterson, N. J.
Grimm, C. R......New York City

Hagar, E. M........Chicago, Ill.
Haight, S. S .....New York City
Hall, M. W.......New York City
Hammatt, W. C..Mexico, Mexico
Hammer, R. H.....New York City
Harlow, J. H...... Pittsburg, Pa.
Harper, A. C .....New York City
Harrington, J. L..New York City
Harris, C. M......New York City
Harrison, E. W.,
Jersey City, N. J.
Harwi, S. J.......Bayonne, N. J.
Harwood, G. A...Syracuse, N. Y.
Hatt, W. K....Washington, D. C.
Hatton, T. C...Wilmington, Del.
Hauck, W.........New York City
Haviland, A.......New York City
Hayes, E..........Cohoes, N. Y.
Hayes, S. W.......Geneva, N. Y.
Hazelton, C. W.,
Turner's Falls, Mass.
Hazen, A.........New York City
Hemming, D. W..New York City
Hendrick, C. W...New York City
Herbert, H. M.,
Bound Brook, N. J.
Hering, R........New York City
Herschel, C.......New York City
Hickok, H. A......Newark, N. J.
Hill, G...........New York City
Hoag, S. W., Jr....New York City
Hodgdon, F. W....Boston, Mass.
Hoffman, N. B. K..New York City
Holliday, A. R....Newcastle, Pa.
Hone, F. de P.....New York City
How, R. W.......New York City
Howe, E. W.......Boston, Mass.
Hudson, C. W...Phœnixville, Pa.
Humphrey, R. L.,
Philadelphia, Pa.
Hunt, Charles Warren,
New York City
Hutchings, W. E.,
Louisville, Ky.

Irving, W. E......New York City

Jacoby, H. S.......Ithaca, N. Y.
Jackson, W........Boston, Mass.
Jaques, W. H.....Boston, Mass.
Jarrett, E. S.......New York City
Johnson, A.......New York City
Johnson, A. L.....St. Louis, Mo.
Johnson, L. J..Cambridge, Mass.
Johnson, W. S.....Boston, Mass.
Just, G. A........New York City

Kaufman, G.....Brooklyn, N. Y.
Kelly, C. W. ..New Haven, Conn.
Kelly, O. M.......New York City
Kenney, E. F...Philadelphia, Pa.

Khuen, R., Jr.....Pittsburg, Pa.
Kimball, G. A.....Boston, Mass.
King, P. S........New York City
King, W., Jr......New York City
Knap, E. D.......New York City
Knap, J. M.......New York City
Knapp, L. H.......Buffalo, N. Y.
Knight, F. B......New York City
Knowles, M.......Pittsburg, Pa.

La Chicotte, H. A..New York City
Lamb, R..........New York City
Landreth, W. B....Albany, N. Y.
Latta, H. W....Philadelphia, Pa.
Lederle, G. A.......Chicago, Ill.
Lee, D. R.....Middletown, N. Y.
Lee, W. B........Hillburn, N. Y.
Leffingwell, F. D..Harrisburg, Pa.
Leisen, T. A ...Wilmington, Del.
Leonard, H. R..Philadelphia, Pa.
Lesley, R. W...Philadelphia, Pa.
Lewis, F. H......Craigsville, Va.
Lewis, M. H......New York City
Lewis, N. P........New York City
Lindenthal, G....New York City
Lofland, H. F.......Pencoyd, Pa.
Loomis, H........New York City
Low, G. E.........New York City
Lowinson, O.......New York City
Ludwig, J. A......New York City
Lund, G. A....Bridgeport, Conn.
Lundie, J..........New York City
Luster, W. H., Jr.Elizabeth, N. J.

Macdonald, A. A..New York City
Macdonald, C.....New York City
MacGregor, R. A..New York City
Machen, H. B......New York City
Maclay, W. W.....New York City
McComb, C. O..Watertown, N. Y.
McDonald, H. P., Jr.,
Jersey City, N. J.
McHarg, L........New York City
McKenzie, T. H.,
Southington, Conn.
McMinn, T. J.....New York City
McNicol, J. A.....New York City
McNulty, G. W...New York City
Malukoff, A. J....New York City
Manley, H.........Boston, Mass.
Marden, H. H., Jr..New York City
Marple, W. M......Scranton, Pa.
Martin, C. C......Brooklyn, N. Y.
Martin, W........New York City
Mason, F..........New York City
Mead, C. A.,
Upper Montclair, N. J.
Mead, E.......Washington, D. C.
Meem, J. C.......New York City
Merriman, M.....Bethlehem, Pa.
Merriman, T......New York City
Merryman, W. C..New York City
Metcalf, L.........Boston, Mass.
Miller, H. A.......Clinton, Mass.
Miller, H. C.......New York City
Miller, R. P ......New York City
Moisseiff, L. S.....New York City
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Moore, W. H..New Haven, Conn.
Morse, C. A......La Junta, Colo.
Moulton, M....Springfield, Mass.
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Myers, J. H.......New York City

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West New Brighton, N. Y.

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Parker, C. J........Rutland, Vt.
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Harrisburg, Pa.
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Russell, R. L....Brooklyn, N. Y.
Ryan, M. H.......New York City

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Sherrerd, M. R....Newark, N. J.
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Stern, E. W.......New York City
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Stewart, J. H.....New York City
Stewart, J. M.....New York City
Stoddard, G. C...New York City
Strachan, J......Brooklyn, N. Y.
Strawn, T. C......Newark, N. J.
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Thomson, T. K...New York City
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Tibbals, S. G....Brooklyn, N. Y.
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Tuttle, A. S.......New York City

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Vier, H...........New York City
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Vredenburgh, W., Jr.
New York City
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Webster, G. S..Philadelphia, Pa.
Webster, W. R.Philadelphia, Pa.
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Wheeler, H. R....New York City
Wheeler, R. N....New York City
Whiskeman, J. P..New York City
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White, W. U ..Philadelphia, Pa.
Whitson, A. M....New York City
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Wiggin, T. H......Boston, Mass.
Wiggins, W. D.....Toledo, Ohio
Wilcock, F. .....New York City
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Williams, R. B., Jr.,
New York City
Williamson, F. S..New York City
Wilson, C. W. S.,
New Rochelle, N. Y.
Wölfel, P. L...Philadelphia, Pa.
Wright, J. B.....New York City

Zook, M. A......Plainfield, N. J.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, March 4th, 1903.—8.30 P. M.—A regular business meeting will be held. Ballots for membership and ballots on the proposed amendment to the Constitution will be canvassed, and a paper by M. H. Gerry, Jr., Assoc. M. Am. Soc. C. E., entitled "A High-Voltage Power Transmission," will be presented for discussion. This paper was printed in *Proceedings* for January, 1903.

Wednesday, March 18th, 1903.—8.30 P. M.—At this meeting a paper by George W. Lilly, Assoc. M. Am. Soc. C. E., entitled "Sand-Blast Cleaning of Structural Steel," will be presented for discussion. This paper is printed in this number of *Proceedings*.

Wednesday, April 1st, 1903.—8.30 P. M. A regular business meeting will be held. Ballots for membership will be canvassed, and two papers will be presented for discussion, as follows: "The Filtration Works of the East Jersey Water Company, at Little Falls, New Jersey," by George W. Fuller, Assoc. M. Am. Soc. C. E.; and "Automatic Modules for Regulating the Speed of Filtration," by Charles Anthony, Jr., M. Am. Soc. C. E. These papers are printed in this number of *Proceedings*.

ADDITIONAL PAPER.

Attention is called to the paper entitled "Note on the Coefficient of Elasticity of Concrete and Mortar Beams During Flexure," by Myron S. Falk, Jun. Am. Soc. C. E., published in this number of *Proceedings*. This paper will not be presented for discussion at any meeting, but written communications on the subject are invited for publication, and its discussion may be called up by any member at any future meeting of the Society.

ANNUAL CONVENTION OF 1903.

The Thirty-fifth Annual Convention of the Society will be held at Asheville, N. C., during the week beginning June 8th, 1903.

ACCESSIONS TO THE LIBRARY.

From January 14th to February 10th, 1903.

DONATIONS.*

FOWLER'S ELECTRICAL ENGINEER'S YEAR-BOOK AND DIRECTORY OF LIGHT, POWER AND TRACTION STATIONS, 1903.

Leather, 6 x 4 ins., 479 pp., illus. Scientific Publishing Company, Manchester. 2 shillings 6 pence, net. Post free, 2 shillings 9 pence.

The preface states that in this book the work of revision has been extensive. Much new matter has been inserted, and among the additions are practical notes on the designing and testing of dynamos and motors. Some information is also given on rotary converters and switch-boards, electric welding, etc. A little pruning has been done to afford space for the fifty or sixty pages of new matter which has been added and the extensions in other directions which were desirable. In an appendix is given a directory of electric light and power stations throughout the United Kingdom, which furnishes the principal particulars of the pressures and methods of distribution as well as of boilers, engines, and electrical equipment, of between 400 and 500 stations. There is an index of nineteen pages.

AMERICAN ENGINEERING PRACTICE.

In the Construction of Rotary Portland Cement Plants, Designed and Erected by Lathbury and Spackman, Philadelphia, Pa. Cloth, 9 x 11 ins., 157 pp., illus. G. M. S. Armstrong, Philadelphia, 1902. $2.00. (Donated by *Cement and Engineering News.*)

In the Announcement the authors state that they offer to those interested, photographic and other illustrations of some of the plants that they have designed and constructed, and of the machinery they contain, all of which they have installed.

MANUAL FOR RESIDENT ENGINEERS.

Containing General Information on Construction. By F. A. Molitor and E. J. Beard. Cloth, 7 x 4½ ins., 4 + 118 pp., 13 tables. New York, John Wiley & Sons, 1903. $1.00.

During the construction of the Choctaw, Oklahoma and Gulf Railroad Company's line across the State of Arkansas in 1899, the first fifty pages of this book were written by the authors and published in blue-print form as "Instructions" to their resident engineers, with a view of obtaining uniformity of method in both work and results. When the company, in 1901, entered upon some 500 miles of extensions and branches separated from one another. making personal supervision difficult and slow, the authors revised the body of the book, and also the standard specifications of the company, which, together with the tables of level cuttings, were added to the original instructions and published in book form for the railroad company's use. After three years of private circulation, the authors have decided to present the "Manual" to the profession generally, and to the younger members particularly, with the hope that it may be as successful in standardizing and simplifying the work of resident engineers throughout the country as it has been in the instance of one railroad. There is an index of five pages.

CATECHISM OF THE LOCOMOTIVE.

By Matthias N. Forney. Second Edition, Revised and Enlarged. Cloth, 8 x 6 ins., 16 + 709 pp., illus. *The Railroad Gazette*, New York, 1897. $3.50.

Since the first edition of this work, in 1873, many changes and improvements have been made in the construction of locomotives, so that in preparing a second edition of the book the first one had to be thoroughly revised, and, to a great extent, rewritten. Also a great deal of entirely new matter had to be added to bring it up to the present state of the art of locomotive engineering. Most of the illustrations are entirely new, and have been selected from the latest practice in this country. The chapter headings are: Force and Motion; Resolution of Motion and Forces; The Principles of the Lever; The Forces of Air and Steam; On Work, Energy and the Mechanical Equivalent of Heat; The Steam Engine; The Expansive Action of Steam; The Slide-Valve; The Action of the Piston, Connecting Rod and Crank; General Description of a Locomotive Engine; Different Kinds of Locomotives; Locomotive Boilers; The Boiler Attachments; The

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* Unless otherwise specified, books in this list have been donated to the Library by the Publisher.

Throttle Valve and Steam Pipes; The Cylinders, Pistons, Guide-Bars, Cross-Heads and Connecting-Rods; The Valve-Gear; Action of the Pistons, Cranks and Driving-Wheels; Adhesions and Traction; Internal Disturbing Forces in the Locomotive; The Running Gear; Miscellaneous; Friction and Lubrication; Screw-Threads, Bolts and Nuts; Tenders; Water-Tanks and Turn-Tables; The Westinghouse Air-Brake; The Care and Use of the Air-Brake; The Eames Vacuum Driving-Wheel Brake; Proportions of Locomotives; Combustion; The Resistance of Trains; Performance and Cost of Operating Locomotives; The Care and Inspection of Locomotives while in the Engine House; Running Locomotives; Responsibilities and Qualifications of Locomotive Engineers; Accidents to Locomotives; Accidents and Injuries to Persons; Properties of Steam; Hyperbolic Logarithms. There is an index of twenty-nine pages.

PROCÉDÉS GÉNÉRAUX DE CONSTRUCTION TRAVAUX D'ART.

Par A. de Préaudeau, avec la collaboration de E. Pontzen. Tome Second: Construction des Ouvrages. Paper, 10 x 6 ins., 3 + 612 pp., illus., Paris, Ch. Béranger, 1903. 20 fr. (Donated by Ernest Pontzen.)

The Contents are: Fondations à l'air libre, à sec et sous l'eau; Procédés de consolidation du sous-sol, accidents; Fondations à l'aide de l'air comprimé; Entretien et réparation des ouvrages, démolitions; Travaux en élévation; Prix de revient (fondations, travaux en élévation).

ENGINEERING FOR LAND DRAINAGE.

A Manual for Laying Out and Constructing Drains for the Improvement of Agricultural Lands. By Charles G. Elliott, M. Am. Soc. C. E. Cloth, 7½ x 5 ins., 8 + 232 pp., illus. New York, John Wiley & Sons, 1903. $1.50.

The preface states that this brief treatise on drainage engineering is intended for the use of those who are charged with the responsibility of making plans for and executing drainage improvements. It puts the experience and practice of years into a form which will be available to others who wish to acquire quickly the principles and practice of land drainage. It has been the purpose of the author to emphasize and make clear those points which the student, the busy agriculturist, and the practical engineer should know. The chapter headings are: Introduction; Soils; Land Drainage Practice; Levelling and Topography; Laying out Drains in the Field; Fixing the Grade of Drains; Maps and Records; Grading the Ditches for Tile; Flow of Water through Pipes; Size of Lateral Drains; Open Drains; Drainage of Barnyards, Cattle-Lanes, etc.; Road Drainage; Drainage Districts; Estimates of Cost; Benefits and Profits of Land Drainage. There is an index of ten pages.

STEAM POWER PLANTS, THEIR DESIGN AND CONSTRUCTION.

By Henry C. Meyer, Jr. Cloth, 9 x 6 ins., 159 pp., illus. New York, McGraw Publishing Co., 1903. $2.00.

The publishers' note states that the matter in this book was written to give information to owners or managers of manufacturing plants or buildings requiring power installations, since they are from time to time called upon to specify or purchase the machinery needed for the proper equipment of their buildings with a view to efficiency and economy in operation. It is believed that the book will also prove valuable to the engineer, architect or student who desires general information on the subject treated. To the expert it claims only to present in accessible and convenient form data useful in the practice of his profession. The Contents are: Design of Steam Power Plants; Proportioning Steam Boilers; Design of Tubular Boilers and Boiler Specifications; Selection of Engines; Specifications for Steam Engines; Steam and Water Piping; Condensers; Feed Water Heaters and Economizers; Mechanical Draft; Chimneys; Coal Handling, Water Supply and Purification.

THE MANUFACTURE AND PROPERTIES OF IRON AND STEEL.

By Harry Huse Campbell, M. Am. Inst. Min. E., M. Am. Soc. C. E., M. Iron and Steel Inst. Second Edition. Cloth, 9 x 6 ins., 29 + 862 pp., illus. New York, *The Engineering and Mining Journal*, 1903. $5.00. (Donated by the Author.)

In this present edition the author has tried to give in Part I a kind of introduction for those who are not metallurgists. It does not pretend to give all the qualifying conditions, but simply the main principles. Part II embraces the ground covered by the first edition of Structural Steel, but many chapters have been entirely rewritten, and a great deal of new matter added. Much of the text relating to the chemical history of the open-hearth furnace has been condensed from certain papers which the author contributed to the *Transactions* of the American Institute of Mining Engineers, while portions of chapters appeared in the *Transactions* of the American Society of Civil Engineers. The experiments and investigations have been conducted at the works of

The Pennsylvania Steel Company, of Steelton, Pa., and all the details of manufacture and treatment have been under the author's direct observation. In Part III the author has entered into a more comprehensive comparison of the industrial situation, and has compared the salient points of foreign and American practice. The Contents are: The Main Principles of Iron Metallurgy; The Errancy of Scientific Records; The Blast Furnace; Wrought-Iron; Steel; High-Carbon Steel; The Acid-Bessemer Process; The Basic-Bessemer Process; The Open-Hearth Furnace; Fuel; The Acid Open-Hearth Process; The Basic Open-Hearth Process; Special Methods of Manufacture and Some Items Affecting the Costs; Segregation and Homogeneity; Influence of Hot Working on Steel; Heat Treatment; The History and Shape of the Test-Piece; The Influence of Certain Elements on the Physical Properties of Steel; Classification of Structural Steel; Welding; Steel Castings; The Iron Industry of the Leading Nations. There is an index of twenty-two pages.

Gifts have also been received from the following:

Am. Inst. of Min. Engrs. 16 pam.
Ariz. Agri. Exper. Station. 1 pam.
Arnold, Bion J. 2 vol.
Australasian Inst. of Min. Engrs. 2 pam.
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Univ. of Texas Mineral Surv. 1 pam.
Weir Frog Co. 1 bound vol.
Unknown Donors. 2 pam.

BY PURCHASE.

Rivières Canalisées. Par F. B. de Mas. Paris, Ch. Beranger, 1903.

The Analysis of Steel-Works Materials. By Harry Brearley and Fred Ibbotson. Longmans, Green and Co., London, New York and Bombay, 1902.

United States Official Postal Guide, January, 1903. Revised and Published Monthly by Authority of the Post Office Department. Contains an Alphabetical List of All the Post Offices in the United States with County and State, a List by States, a List by States and Counties, Showing the Money-Order Offices, Domestic and International; also, Rates of Postage; Synopsis of Postal Laws, Orders, Rulings of the Department; Information Relating to Postal Matters; and General Regulations Respecting Foreign Mails. Philadelphia, George F. Lasher.

SUMMARY OF ACCESSIONS.

From January 14th to February 10th, 1903.

Donations (including 10 duplicates)	111
By Purchase	3
Total	114

MEMBERSHIP.

ADDITIONS.

MEMBERS.

Name	Address	Grade	Date of Membership.
Allan, Percy	Public Works Dept., Sydney, N. S. W., Australia	Assoc. M. M.	April 1, 1896 Oct. 1, 1902
Barnard, Edward Chester	Topographer, U. S. Geological Survey, Washington, D. C.		Dec. 3, 1902
Dyer, Arthur James	Engr. in chg., Great Falls Power Co., Nashville, Tenn	Assoc. M. M.	Mar. 6, 1901 Feb. 4, 1903
Fitch, Graham Denby	Capt., Corps of Engrs., U. S. A., U. S. Engr. Office, Little Rock, Ark		Feb. 4, 1903
Sherman, Charles Winslow	Div. Engr., Sudbury Dept., Met. Water-Works, 1 Ashburton Pl., Boston, Mass	Jun. Assoc. M. M.	Oct. 8, 1891 May 2, 1900 Feb. 4, 1903
Thompson, Henry Clark	Div. Engr., N. Y. C. & H. R. R. R., 42 Lorillard Pl., Fordham, New York City		Feb. 4, 1903
Wisner, George Monroe	Asst. Chf. Engr., San. Dist. of Chicago, 1010 Security Bldg., Chicago, Ill		Feb. 4, 1903

ASSOCIATE MEMBERS.

Name	Address	Grade	Date of Membership.
Ashbaugh, Lewis Eugene	Asst. Prof. of Civ. Eng., Iowa State Coll., Ames, Iowa		Jan. 7, 1903
Auryansen, Frederick	Chf. Draftsman, Atlantic Ave. Impvt., L. I. R. R., 44 Court St., Brooklyn, N. Y	Jun. Assoc. M.	Oct. 5, 1897 Dec. 3, 1902
Bacon, George Morgan	624 Dooly Blk., Salt Lake City, Utah		Dec. 3, 1902
Bantel, Edward Christian Henry	Instr. in Civ. Eng., Univ. of Texas, 2600 Whitis Ave., Austin, Tex		Feb. 4, 1903
Bradshaw, Sam Wigfall	Asst. Engr., Estimating Dept., Pennsylvania Steel Co., Steelton, Pa	Jun. Assoc. M.	Oct. 2, 1900 Feb. 4, 1903
Dana, Richard Turner	Railroad Location and Gen. Engr., Room 206, Bennett Bldg., New York City	Jun. Assoc. M.	Sept. 11, 1900 Feb. 4, 1903
Day, Edward Bliss	Office Engr., Burlington's Missouri Lines, Room 610, Globe Democrat Bldg., St. Louis, Mo		Feb. 4, 1903
Ferguson, William Hastings	(Best & Ferguson, Cons. Engrs.), 16 Ferguson Bldg., Denver, Colo		Jan. 7, 1903

		Date of Membership.
HALL, CHARLES ROMNEY		
U. S. Eng. Dept., Fort McKinley, Portland Harbor, Me..		Jan. 7, 1903
JAUDON, HENRY SCUDDER		
Care, Birmingham Water-Works Co., Birmingham, Ala...		Feb. 4, 1903
McKAY, GEORGE ALBERT		
Civ. Engr., U. S. N., Narragansett Bay Coal Depot, Newport, R. I.		Feb. 4, 1903
ROCKWELL, JAMES VINCENT		
Asst. Engr., C. & N. W. Ry., Eagle Grove, Iowa	Jun. Assoc. M.	April 3, 1900 Feb. 4, 1903
SHEPARDSON, JOHN EATON		
Shabbona Grove, De Kalb Co., Ill		Jan. 7, 1903
TOMPKINS, EDWARD DE VOE		
Chf. Draftsman, Bureau of Yards and Docks, U. S. Navy Yard, League Island, Philadelphia, Pa.	Jun. Assoc. M.	Feb. 2, 1897 Dec. 3, 1902
WHEELER, RALPH NORMAN		
With Rapid Transit R. R. Comm., 13 Astor Pl., New York City		Jan. 7, 1903
WHITE, LAZARUS		
18 West 119th St., New York City	Jun. Assoc. M.	May 1, 1900 Feb. 4, 1903

ASSOCIATES.

KELLER, OTTO BALTHAZAR	
127 Fulton St., New York City	Feb. 3, 1903
QUIRK, EUGENE McGRATH	
Mgr., Montreal Quarry Co., 266 Boulevard, Ville St. Louis, Montreal, Que., Canada	Feb. 3, 1903

JUNIORS.

BASSETT, ROBERT JAY	
25 North 4th St., Steelton, Pa	Feb. 3, 1903
DOUGHERTY, RICHARD ERWIN	
244 West 20th St., New York City	Jan. 6, 1903
FUJINO, SHUKICHI	
Bridge Engr., Nippon Tetsudo Kwaisha, Tokyo, Japan...	Feb. 3, 1903
GEORGE, HUGH MELVIN	
Care, Water Co., Meridian, Miss	Feb. 3, 1903
KOLB, HENRY JACOB	
Care, Dr. Dillworth, Bedford Park, New York City	Feb. 3, 1903
PEARSE, LANGDON	
317 Walnut Ave., Roxbury, Mass	Jan. 6, 1903
TOMBO, CARL	
273 West 138th St., New York City	Feb. 3, 1903
WILDES, WALDO GILMAN	
208 Church St., Clinton, Mass	Feb. 3, 1903

RESIGNATIONS.

MEMBERS.

	Date of Resignation.
SEE, HORACE	Dec. 31, 1902
WALTON, CHARLES WALLACE	Dec. 31, 1902

DEATHS.

BARRIGER, JOHN WALKER, Jr.	Elected Junior, May 31st, 1898; Associate Member April 2d, 1902; died December 19th, 1902.
FUERTES, ESTEVAN ANTONIO	Elected Member February 17th, 1869; died January 16th, 1903.
RICH, WATSON WELLMAN	Elected Member September 5th, 1883; died January 12th, 1903.
SWEET, ELNATHAN	Elected Member November 6th, 1878; died January 27th, 1903.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(January 14th to February 10th, 1903.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings*, Eng. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
(7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine*, New York City, 25c.
(10) *Cassier's Magazine*, New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News*, New York City, 15c.
(14) *The Engineering Record*, New York City, 12c.
(15) *Railroad Gazette*, New York City, 10c.
(16) *Engineering and Mining Journal*, New York City, 15c.
(17) *Street Railway Journal*, New York City, 35c.
(18) *Railway and Engineering Review*, Chicago, Ill., 10c.
(19) *Scientific American Supplement*, New York City, 10c.
(20) *Iron Age*, New York City, 10c.
(21) *Railway Engineer*, London, England, 25c.
(22) *Iron and Coal Trades Review*, London, England, 25c.
(23) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal*, New York City, 10c.
(25) *American Engineer*, New York City, 20c.
(26) *Electrical Review*, London, England.
(27) *Electrical World and Engineer*, New York City, 10c.
(28) *Journal*, New England Water-Works Assoc., Boston, $1.
(29) *Journal*, Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
(31) *Annales de l' Assoc. des Ing. Sortis des Ecôle Spéciales de Gand*, Brussels, Belgium.
(32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
(33) *Le Génie Civil*, Paris, France.
(34) *Portefeuille Économique des Machines*, Paris, France.
(35) *Nouvelles Annales de la Construction*, Paris, France.
(36) *La Revue Technique*, Paris, France.
(37) *Revue de Mécanique*, Paris, France.
(38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
(39) *Railway Master Mechanic*, Chicago, Ill., 10c.
(40) *Railway Age*, Chicago, Ill., 10c.
(41) *Modern Machinery*, Chicago, Ill., 10c.
(42) *Transactions*, Am. Inst. Elec. Engrs., New York City, 50c.
(43) *Annales des Ponts et Chaussées*, Paris, France.
(44) *Journal*, Military Service Institution, Governor's Island, New York Harbor, 50c.
(45) *Mines and Minerals*, Scranton, Pa., 20c.
(46) *Scientific American*, New York City, 8c.
(47) *Mechanical Engineer*, Manchester, England.
(54) *Transactions*, Am. Soc. C. E., New York City, $5.
(55) *Transactions*, Am. Soc. M. E., New York City, $10.
(56) *Transactions*, Am. Inst. Min. Engrs., New York City, $5.
(57) *Colliery Guardian*, London, England.
(58) *Proceedings*, Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(59) *Transactions*, Mining Inst. of Scotland, London and Newcastle-upon-Tyne.
(60) *Municipal Engineering*, Indianapolis, Ind., 25c.
(61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburg, Pa.
(63) *Minutes of Proceedings*, Inst. C. E., London, England.
(64) *Power*, New York City, 20c.
(65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting*, London, England, 15c.
(67) *Cement and Engineering News*, Chicago, Ill., 25c.
(68) *Mining Journal*, London, England.

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Electricity as an Underground Motive Power. Wm. Little. (Paper read to the New Seaham Mining Students' Assoc.) (62) Jan. 22.
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Machine Tools with Individual Electric Motors. R. T. E. Lozier. (10) Feb.
The Electrical Resistance of Bearings. A. E. Kennelly and C. A. Adams. (27) Feb. 7.
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Essais de Divers Modes d'Enveloppes de Chaudières de Locomotives.* H. Ledoux. (38) Feb.

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The Constituent Parts of Concrete. (14) Mar. 7.
Décomposition des Mortiers par les Eaux Chargées de Sulfate de Chaux. J. Bied. (43) 8e Trimestre, 1902.
Les Nouveaux Ateliers de la Société l'Éclairage Électrique à Paris.* Léon Griveaud. (35) Feb.

Water Supply.

Madeley Water Supply.* (12) Feb. 6.
Current Meter Ratings and Observations by the U. S. Irrigation Investigations Department. (13) Feb 12.
Electric Water Power at Manchester, N. H., Mills.* (27) Feb. 14.
Royal Commission Studies on Pollution and Self-Purification of the River Severn. (13) Feb. 19.
1,000-H. P. Water-Power Electric Plant at Manchester, Conn.* (27) Feb. 21.
The Water Supply of London. (19) Serial beginning Feb. 21.
The Ozone Water-Works at Wiesbaden and Paderborn.* (46) Feb. 21.
The Purification of Feed Water. J. B. Greer. (Paper read before the Ry. Club of Pittsburg.) (18) Feb. 28.

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* Illustrated.

Water Supply—(Continued).

The Construction of the Asyut Dam; Nile Irrigation Works.* (46) Feb. 28.
Hydrant Rental. D. H. Sawyer. (60) Mar.
A Hydro-Electric Power Plant in Newfoundland.* Earl E. Boardway. (27) Mar. 7.
A Water-Power Plant near Grenoble, France. (14) Mar. 7.
Air Testing in Tunnel Construction (Cincinnati Water-Works).* Joseph W. Ellms. (Paper presented to the Amer. Pub. Health Assoc.) (14) Mar. 7.
Barrages à Parements Rectilignes. Gustave Cadart. (43) 3e Trimestre, 1902.
L'Alimentation d'Eau des Villes. E. d'Esménard. (36) Serial beginning Jan. 25.

Waterways.

Plant and Methods Employed in Excavating Ambrose Channel, New York Harbor. (13) Feb. 12.
The Concrete-Steel Culvert for Stream Diversion at Kalamazoo, Mich.* Geo. S. Pierson, M. Am. Soc. C. E. (13) Feb. 12.
A Deep Waterway from the Lakes to the Atlantic. (13) Feb. 26.
Impounding Mining Debris in Yuba River, California.* Franklin Riffle, M. Am. Soc. C. E. (14) Feb. 28.
Modern Machinery for Excavating and Dredging.* A. W. Robinson. (9) Mar.
Note sur la Construction d'une Nouvelle Écluse à Port-à-l'Anglais sur la Haute-Seine. M. Alby. (43) 3e Trimestre, 1902.
IXe Congrès International de Navigation Tenu à Düsseldorf.* L. Coiseau. (32) Dec.
Les Ports Principaux du Nord et de l'Ouest de la France: Les Portes d'Écluse: Rapport de Mission. A. J. Pierrot and J. Melotte. (30) Feb.
Les Dragages par Succion dans l'Estuaire de la Seine.* L. Sekutowicz. (33) Feb. 14.
Agrandissement de l'Usine Hydraulique du Port de Bordeaux.* Ch. Dantin. (33) Feb. 21.

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* Illustrated.

Vol. XXIX. APRIL, 1903. No. 4.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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April 1st, 1903.—The meeting was called to order at 8.40 P. M., President Noble in the chair; Chas. Warren Hunt, Secretary, and present, also, 119 members and 25 guests.

The minutes of the meetings of March 4th and 18th, 1903, were approved as printed in *Proceedings* for March, 1903.

A paper entitled "The Filtration Works of the East Jersey Water Company, at Little Falls, New Jersey," by George W. Fuller, Assoc. M. Am. Soc. C. E., was presented by the author and illustrated with lantern slides. The paper was discussed by Messrs. Allen Hazen, J. P. A. Maignen, Rudolph Hering, C. L. Harrison, J. Waldo Smith, R. S. Weston, George C. Whipple, William B. Fuller, L. L. Tribus and the author.

A paper entitled "Automatic Modules for Regulating the Speed of Filtration," by Charles Anthony, Jr., M. Am. Soc. C. E., was presented by title. On this paper there was no discussion.

Ballots for membership were canvassed, and the following candidates elected:

As Members.

Baxter Lamont Brown, St. Louis, Mo.
Albert Harlow Dakin, Jr., New York City.
Charles Morton Emmons, Beaver Falls, Pa.
Fred Eugene Foss, State College, Pa.
Owen Bert French, Washington, D. C.
Morris Knowles, Pittsburg, Pa.
Carl Gustaf Emil Larsson, Pencoyd, Pa.
Samuel Phillips Mitchell, Philadelphia, Pa.
Henry Tegmeyer Porter, Greenville, Pa.
Charles Lewis Potter, Memphis, Tenn.
Henry Rohwer, St. Louis, Mo.
Henry Bedinger Rust, Pueblo, Colo.
Clifford Stanley Sims, New York City.
Leonard Chase Wason, Brookline, Mass.
Robert Patterson Woods, Indianapolis, Ind.

As Associate Members.

William Hoyt Balch, Washington, D. C.
Edward Joseph Carney, New York City.
Allan Wadsworth Carpenter, Jersey Shore, Pa.
Charles Corwin Crew, Versailles, Mo.
James Laird de Vou, Philadelphia, Pa.
Benjamin Franklin, Philadelphia, Pa.
Morgan Dodge Hayes, Pittsburg, Pa.
William Hale Kimball, Davenport, Iowa.
Francis Mason, New York City.
Sergius Pavlovitch Maximoff, St. Petersburg, Russia.
George Soter Miller, Fishers Island, N. Y.
James Adolphus Omberg, Jr., Memphis, Tenn.
Clifford Moses Pritchard, Leavenworth, Kans.
John Corneliious Sesser, Kansas City, Mo.
Marshall Ney Shoemaker, Philadelphia, Pa.
James William Skelly, St. Louis, Mo.

The Secretary announced the election of the following candidates by the Board of Direction on March 31st, 1903:

As Juniors.

Mark Anthony Beltaire, Jr., New York City.
Edwin Merritt Holmes, Daiquiri, Cuba.
Augustus Kempkey, Jr., Oakland, Cal.
James Henry Miner, Fort Dodge, Iowa.

Egbert Jessup Moore, Phœnixville, Pa.
George Tilley Seabury, New York City.
James Hampden Small, Jr., New York City.
Herbert Joseph Wild, Portland, Me.

The Secretary announced the following deaths:

Charles Andrews Knowlton, elected Member October 2d, 1901; died March 2d, 1903.

Robert Blum Olney, elected Junior January 3d, 1895; Associate Member September 5th, 1900; died March 19th, 1903.

William Johnston Taylor, elected Fellow May 10th, 1870; died March 25th, 1903.

Adjourned.

April 15th, 1903.—The meeting was called to order at 8.45 P. M., President Noble in the chair; Chas. Warren Hunt, Secretary, and present also, 54 members and 8 visitors.

A paper entitled "An Investigation of the Properties of Brick Under Different Physical Conditions," by S. M. Turrill, Assoc. Am. Soc. C. E., was presented by the Secretary, who also read a communication on the subject from E. J. McCaustland, Assoc. M. Am. Soc. C. E.

The Secretary announced the death of William Warren Card, elected Member September 5th, 1883; died April 4th, 1903.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

March 31st, 1903.—8.40 P. M.—President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Briggs, Craven, Croes, Davison, Knap, Kuichling, Pegram, Osgood, and Schneider.

The following resolution was passed:

> "That in the future in any year the Collingwood Prize for Juniors is not awarded, a sum equal to the value of the Prize be appropriated for the purchase of books, photographs, or exhibits of American Engineering Works; such exhibits to be inscribed in a manner indicating their source; and that it be made the duty of the Library Committee to expend such funds."

The following gentlemen were added to the Local Committee of Arrangements for the Convention already announced:

J. C. GUILD, Chattanooga, Tenn.
GEORGE O. TENNEY, Spartanburg, S. C.
W. A. LELAND, Columbia, S. C.
NESBIT WINGFIELD, Augusta, Ga.
J. N. HAZLEHURST, Mobile, Ala.

The following resignations were accepted: Archibald Alexander Schenck, M. Am. Soc. C. E.; Walter Bruce Gormly, Jun. Am. Soc. C. E.

Applications were considered and other routine business transacted.

Eight candidates for admission as Junior were elected.*

Adjourned.

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* See page 128.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, May 6th, 1903.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and two papers will be presented for discussion, as follows: "A Small Rock-Fill Dam," by H. deB. Parsons, M. Am. Soc. C. E.; and "Deflection of Beams with Variable Moments of Inertia," by C. W. Hudson, M. Am. Soc. C. E. These papers were printed in *Proceedings* for March, 1903.

Wednesday, May 20th, 1903.—8.30 P. M.—At this meeting a paper, by D. M. Andrews, M. Am. Soc. C. E., entitled "The Economic Improvement of the Coosa and Alabama Rivers, in Georgia and Alabama," will be presented for discussion. This paper is printed in this number of *Proceedings*.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra-work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction to the members who have made use of the resources of the Society in this manner has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling compared to the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches for members to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

ANNUAL CONVENTION OF 1903.

The Thirty-fifth Annual Convention will be held at Asheville, N. C., June 9th, 10th, 11th and 12th, 1903.

A circular will soon be issued giving information as to arrangements, which are in the hands of the following Committees:

COMMITTEE OF THE BOARD OF DIRECTION.

J. JAMES R. CROES, *Chairman.*

GEORGE H. PEGRAM, CHAS. WARREN HUNT.

LOCAL COMMITTEE.

J. L. LUDLOW, *Chairman.*

WILLIAM CAIN,
WILBUR F. FOSTER,
GEORGE W. FRANK,
J. C. GUILD,
J. N. HAZLEHURST,
W. B. W. HOWE,
W. A. LELAND,
J. IMBRIE MILLER,
WILLIAM MONCURE,
J. A. MONTGOMERY,
E. T. D. MYERS,
ARTHUR PEW,
GEORGE O. TENNEY,
NESBIT WINGFIELD.

TOPICS FOR INFORMAL DISCUSSION.

Topic No. 1. Timber Tests. (See statement in detail as to this subject, on page 133.)

Topic No. 2. Sewage Purification. (This subject will be presented by Rudolph Hering, M. Am. Soc. C. E.)

Topic No. 3. In the treatment of the Mississippi River, is the Levee Theory justified by Experience?

Topic No. 4. Is it possible to make Concrete which will be Impervious to Water? If so, what is the best method?

Topic No. 5. What is the effect of Sea-Water upon Steel, and upon Steel and Concrete used in Combination, and is the use of Steel in Sea-Water admissible?

Topic No. 6. In view of the increasing weights of Rolling Stock, for what loadings should Railroad Bridges be designed?

Discussion on each of these subjects is invited. Communications from members who are unable to attend the Convention will be presented by the Secretary.

TIMBER TESTS.

This subject will be introduced for discussion at the Annual Convention by Gifford Pinchot, Assoc. Am. Soc. C. E., of the Bureau of Forestry, of the U. S. Department of Agriculture, who has prepared the following statement:

The Bureau of Forestry, of the United States Department of Agriculture, intends to resume the work of testing timber formerly carried on by the Division of Forestry during the years 1891–1896. A large portion of the groundwork covered by the proposed investigation is of interest to engineers, and it is the desire of the Bureau that the results obtained shall be of the greatest value to them. To this end it is hoped that those engineers interested in the application of timber to construction, will, in this discussion, offer suggestions and make criticisms which will aid the Bureau in planning this series of tests.

It is the intention of the Bureau to take up these tests in a thorough manner and devote whatever time may be necessary for the solution of the problems involved. It is expected that the plan of operation will be sufficiently complete, and the methods of tests so well chosen, that the data obtained may be accepted by all experts.

The following account of the proposed tests is of a very general nature. Those who are particularly interested can obtain a description of the proposed tests in greater detail on application to the Bureau of Forestry, Washington, D. C.

The Bureau aims at results of practical value, such as the values expressing the strength and stiffness of the principal merchantable species of timber of this country. Not only will this be done for timber now in use, but efforts will be directed to ascertaining the value for structural purposes of timbers at present not largely used, as, for example, the Western Hemlock and the Southern Gums. A thorough series of tests will be made of the timbers of the Pacific Slope, particularly the Red Fir, otherwise called Oregon Pine or Douglas Spruce, which is now finding its way in increasing quantities to eastern markets. If it should appear that the work done on the Southern Pines by the Division of Forestry during the years 1891–1896 has been sufficiently complete, the proposed tests will not cover these timbers.

Experimentation will be directed also in advance to the investigation of the effects of different factors of the testing processes on the results, such as speed of application of a load, method of moisture determination, the effect of moisture, and of volatile oils.

The investigation of the effect of technological operations, such as methods of kiln drying, methods of preserving timber, etc., will be undertaken.

In determining the values of the strength and stiffness of various merchantable timbers, tests will be made, both on timber collected from the market and on timber collected in the forest. Full-sized sticks, as used in construction, will in all cases be tested under their appropriate loadings.

Work is at present in progress at a station in California, on the different merchantable grades of these full-sized timbers, such as bridge stringers and car sills collected on the market. The locality of origin of the timbers is determined, and a full description of each stick, as well as a series of photographs of all six sides, is made a matter of record. Full information of the physical and mechanical properties of the sticks under test will be obtained.

The investigation of the effect of various conditions of forest growth on the physical and mechanical properties of timber will be undertaken whenever the Bureau is thoroughly prepared for this work.

It is hoped that the discussion will take up the need of making timber tests from the standpoint of the engineer. Suggestions are invited as to those particular matters which at present most need investigation. It is also desired that discussion shall take place concerning the methods of performing the tests, particularly as to the best method of determining the moisture in timber; and the best method of determining the shearing strength of timber.

It is hoped that a full criticism of the former tests, both as to methods and content, will be given.

It is recognized that timber is subject to a great number of variables. From the botanical standpoint, the ideal method of procedure would be to determine the properties of the wood fiber of each species representing the normal growth of straight-grained timber. With these standard values as a basis, inquiries could be directed to ascertain how much the values are affected by such variables as moisture, oil, speed of test, imperfection of structure due to direction of grain or knots, rate of growth, diseases of the tree, technological processes such as kiln drying or preserving, etc.; forest conditions, region, and growth. It would seem that the interests of all, whether engineers, manufacturers, or botanists, would be consulted by such a method of procedure. The particular series of tests on full-sized sticks of market timber would form part of this general scheme.

ACCESSIONS TO THE LIBRARY.

From March 11th to April 7th, 1903.

DONATIONS.*

STORAGE BATTERY ENGINEERING.

A Practical Treatise for Engineers. By Lamar Lyndon, Assoc. M. Am. Inst. E. E. Cloth, 9½ x 6½ ins., 382 pp., illus. New York, McGraw Publishing Company, 1903. $3.00.

This book is intended to assist the practicing engineer in designing, installing and maintaining battery equipments, and to guide him in the selection of types of batteries and auxiliary apparatus best suited to the service which they are to perform, and at the same time impress upon the technical public, both the advantages and limitations of the storage battery in practice. Mathematics have been avoided as far as possible. The Osmotic and Thermodynamic theories of the storage battery have not been discussed, as their comprehension requires more electro-chemical knowledge than the majority of electrical engineers possess, and this work is intended to be a practical engineers' manual. The chapter headings are: General Theory of the Storage Battery; General Requirements; On Voltage and its Variation; On Quantity and Distribution of Active Material; On Electrolyte; On Quantity of Electrolyte; On Internal Discharge; On the Influence of Temperature; On Capacity Variation; On Internal Resistance; On Efficiency; On the Durability and Causes of Deterioration; On Diseases and their Remedies; On Care and Management; Types of Planté Plates; Methods of Planté Formation; Faure System; Applied Active Material Mixtures; Envelopes and Separators; Containing Cells; Assembling and Installing; Testing; Miscellaneous Data. There is an index of five pages.

SPECIFICATIONS FOR ELECTRIC RAILWAY BRIDGES. 1902.

By C. S. Davis. Paper, 9 x 6 ins., 8 + 48 pp. Toledo, C. S. Davis, 1902. 50 cents.

In these specifications an equivalent load has been used by the author for the reason that the wheel base and wheel loads for electric railway cars vary to such an extent that it seems a useless task to use a different wheel load and wheel base for every line. The equivalent load used is the same for any span length, and gives results reasonably close for any wheel base that is now being used. There are nine general divisions, as follows: General Description; Loads; Unit Stresses; Details of Design; Shop Work; Field Work; Quality of Material; Inspection; Maintenance.

HEATING AND VENTILATING BUILDINGS.

A Manual for Engineers and Architects. By Rolla C. Carpenter, M. Am. Soc. M. E. Fourth Edition, Revised and Enlarged. Cloth, 9 x 6 ins., 16 + 562 pp., illus. New York, John Wiley & Sons, 1903. $4.00.

The present edition of this work has been very largely re-written and considerable new matter added, the size of the book, as compared with the first edition, being increased by nearly one-third. Three new chapters have been added: One relating to the fan or blower for moving air, another to the general subject of mechanical systems of heating and ventilating, and a third to schoolhouse heating and ventilation. It is believed that the book in its present form describes the latest improvements in the art of heating and ventilating. It also gives directions for the construction and installation of all the various sytems of heating and ventilating now in use. The Contents are: Nature and Properties of Heat; Principles of Ventilation; Amount of Heat Required for Warming; Heat Given off from Radiating Surfaces; Pipe and Fittings Used in Steam and Hot-Water Heating; Radiators and Heating Surfaces; Steam-Heating Boilers and Hot-Water Heaters; Settings and Appliances; Methods of Operating; Various Systems of Piping; Design of Steam and Hot-Water Systems; Heating with Exhaust Steam; Non-Gravity Return Systems; Heating with Hot Air; Mechanical Ventilators; Mechanical Systems of Heating and Ventilating; Heating with Electricity; Temperature Regulators; Schoolhouse Warming and Ventilation; Specification Proposals and Business Suggestions; Appendix. There is an index of twenty pages.

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* Unless otherwise specified, books in this list have been donated by the Publishers.

DISINFECTION AND DISINFECTANTS.

A Practical Guide for Sanitarians, Health and Quarantine Officers. By M. J. Rosenau. Cloth, 8 x 6 ins., 353 pp., illus. Philadelphia, P. Blakiston's Son & Co., 1902. $2.00.

The preface states that this book has been written with the hope that it may help others who have to battle with the infection of the communicable diseases. The author has tried to set down the results of his experience gained in sanitary work of a public-health character, both in the field and in the laboratory. It has been his aim to state the important facts in a form to be of practical use to the disinfector. The subject has been considered from the standpoint of the disinfectant used, the object to be disinfected, and the disease for which the disinfection is done. In considering any subject from three points of view a certain amount of repetition is unavoidable. The chapter headings are: Introduction; Physical Agents; Gaseous Disinfectants; Chemical Solutions; Insecticides Applied to Disinfection Against the Insect-Borne Diseases; Disinfection of Houses, Ships and Objects; Disinfection for the Communicable Diseases. There is an index of seven pages.

THE ELECTRIC TELEPHONE.

By Edwin J. Houston and A. E. Kennelly. Second Edition, Enlarged. Cloth, 7 x 5 ins., 6 + 453 pp., illus. New York, Electrical World and Engineer, copyright 1902. $1.00. (Presented by the McGraw Publishing Co.)

The authors have prepared this little book on the telephone, in the hope of enabling those who are not trained in electro-technics to understand the main principles and method of operation of the telephone systems of to-day. Since the first edition much growth and development have taken place in telephonic engineering and practice. The authors have added three new chapters upon recent subjects of importance, and believe, that by so doing, the book will be brought up to date. The chapter headings are: Introductory; Elementary Acoustic Principles; The Telephone Receiver; The Microphone Transmitter; The Induction Coil; Call Bells and Batteries; Single-Circuit Connections; Multiple-Circuit Connections; Isolated-Station Switchboards; Multiple Switchboards; Telephonic Circuits; Long-Distance Telephony; Radiphony and Miscellaneous Applications of Electricity; Common-Battery Systems; Visual Signals; Loaded Telephone Circuits. There is an index of twenty-seven pages.

THE ART OF ILLUMINATION.

By Louis Bell. Cloth, 9 x 6 ins., 339 pp., illus. New York, McGraw Publishing Co., 1902. $2.50.

The author states in the preface that this volume is a study of the utilization of artificial light. It is intended to deal, not with the problem of distributing illuminants, but with their application, and treats of the illuminants themselves only in so far as a knowledge of their peculiarities is necessary to their intelligent use. To compress the subject within reasonable bounds, it has been necessary to discuss general principles rather than concrete examples of artificial lighting. The Contents are: Light and the Eye; Principles of Color; Reflection and Diffusion; The Materials of Illumination—Illuminants of Combustion; The Materials of Illumination—Incandescent Burners; The Electric Incandescent Lamp; The Electric Arc Lamp; Shades and Reflectors; Domestic Illumination; Lighting Large Interiors; Street and Exterior Illumination; Decorative and Scenic Illumination; The Illumination of the Future; Standards of Light and Photometry. There is an index of five pages.

RAILROAD CONSTRUCTION, THEORY AND PRACTICE.

A Text-Book for the Use of Students in Colleges and Technical Schools. By Walter Loring Webb, Assoc. M. Am. Soc. C. E. Second Edition, Revised and Enlarged. Morocco, 7 x 4 ins., 17 + 675 pp., illus. New York, John Wiley & Sons, 1903. $5.00.

The preface states that the inconvenience of the octavo edition for field-work was found to be limiting the use of the book. It was therefore decided to recast the whole work and reduce the page from "octavo" to "pocket-book" size. Advantage was then taken of the opportunity to revise freely and to add new matter. The author's primary aim has been to produce a text-book for students, the subject-matter has therefore been cut down to that which may properly be required of students in the time usually allotted to railroad work in a civil-engineering curriculum. On this account no extended discussion has been given to the multitudinous forms of various railroad devices in the chapters on structures. The aim has been to teach the principles and to guide the students into proper methods of investigation. The Contents are: Railroad Surveys; Alignment; Earthwork; Trestles; Tunnels; Culverts and Minor Bridges; Ballast; Ties and Other Forms of Rail Support; Rails; Rail-Fastenings; Switches and Crossings; Miscellaneous Structures and Buildings; Yards and Terminals; Block Signaling; Rolling Stock; Train Resistance; Cost of Railroads; The Promotion of Railroad Projects; Operating Expenses; Distance; Curvature; Grade; Improvement of Old Lines; Adjustments of Instruments. There is an index of twenty-three pages.

BLACKWELL'S ISLAND BRIDGE IN THE CITY OF NEW YORK.

By Gustav Lindenthal. Paper, 24 x 15 ins., 6 plates. New York, 1903. 60 cents. (Donated by the author.)

SELF-PROPELLED VEHICLES.

A Practical Treatise on the Theory, Construction, Operation, Care and Management of All Forms of Automobiles. By James E. Homans. Cloth, 9 x 6 ins., 6 + 626 pp., illus. New York, Theo. Audel & Company, 1902. $2.00.

The preface states that the treatment of subjects throughout this work has been kept as nearly as possible in the lines popularly called "non-technical," and the various theories and problems involved in the construction and operation of the prevailing types of motor road carriages have been stated as clearly and simply as possible, in order that the involved situations may be readily comprehended by all readers. The fundamental principles of the several types of motor, particularly of the gasoline engine, have been treated at considerable length, in order that the facts may be comprehended in their new relations. It has been the author's aim to state and discuss the most important points of this already immense subject, and to treat only of constructions that have been proven thoroughly practical. There is an index of six pages.

A PHILOSOPHICAL ESSAY ON PROBABILITIES.

By Pierre Simon, Marquis de Laplace. Translated from the Sixth French Edition by Frederick Wilson Truscott and Frederick Lincoln Emory, M. Am. Soc. M. E. Cloth, 8 x 5 ins., 4 + 196 pp. New York, John Wiley & Sons, 1902. $2.00.

This essay is the development of a lecture on probabilities which the author delivered in 1795 to the normal schools whither he had been called, by a decree of the national convention, as professor of mathematics, with Lagrange. The author presents here, without the aid of analysis, the principles and general results of the theory of probabilities, applying them to the most important questions of life.

Gifts have also been received from the following:

Am. Inst. of Min. Engrs. 17 pam.
Assoc. Parisienne des Propriétaires d'Appareils à Vapeur. 1 vol.
Binghamton, N. Y.—City Engr. 1 pam.
Bond, Edward A. 2 pam.
Boston, Mass.—City Auditor. 5 bound vol.
Boston, Mass.—Fire Dept. 8 bound vol., 10 pam.
Boston, Mass.—Street Dept. 7 bound vol.
Bouscaren, G. 1 bound vol.
Brandon, Vt.—Town Officers. 7 pam.
Brooklyn, N. Y.—Commr. of Pub. Works. 2 pam.
Buck, Henry R. 1 bound vol., 18 pam.
Burlington, Vt.—City Clerk. 22 vol.
Burlington, Vt.—Water Dept. 1 pam.
Cairns, Robert A. 1 pam.
Cambridge, Mass.—City Clerk. 6 bound vol., 1 vol.
Canada—Chf. Engr. of Rys. and Canals. 1 vol., 8 pam.
Canada—Tidal Survey. 4 pam.
Chicago, St. Paul, Minneapolis & Omaha Ry. Co. 1 pam.
Colo.—Agri. Exper. Station. 8 pam.
Colo.—State Engr. 1 vol.
Columbus, Ohio—Water-Works Dept. 1 pam.
Cumberland Valley R. R. Co. 1 pam.
Currier, C. G. 7 pam.
Delaware & Hudson Co. 1 pam.
Eng. Assoc. of the South. 1 pam.
Eng. News Pub. Co. 188 bound vol., 96 vol., 811 pam.
Eng. Standards Committee. 1 pam.
Ford, Frederick L. 1 pam.
Furber, William Copeland. 1 pam.
Glasgow & South-Western Ry. Co. 1 pam.
Gloucester, Mass.—Water Commrs. 6 pam.
Grand Rapids & Indiana Ry. Co. 1 pam.
Great Britain—Patent Office. 2 vol., 2 pam.
Green Bay & Western R. R. Co. 2 pam.
Griggs, Julian. 1 vol., 6 pam.
Hunt, Chas. Warren. 2 pam.
Inst. of Civ. Engrs. of Ireland. 6 vol.
Jackson, G. W. 1 pam.
Jenkins, Wm. Dunbar. 1 pam.
Lansing, E. Ten Eyck. 1 pam.
Lawrence, Mass.—Water Board. 1 pam.
Lib. of Cong. 1 pam.
Manchester Steam Users' Assoc. 1 pam.

Mass.—Metropolitan Park Comm. 1 bound vol.
Merchants' Assoc. of New York. 1 vol.
Missouri Pacific Ry. Co. 1 pam.
N. J.—State Geologist. 1 bound vol.
N. Y.—R. R. Commrs. 2 bound vol.
N. Y. Univ. 1 pam.
Northern Central Ry. Co. 1 pam.
Norwich Univ. 1 pam.
Olds, Clark. 19 pam.
Rafter, Geo. W. 2 vol.
Read, R. L. 1 bound vol., 7 pam.
St. Louis Merchants' Exchange. 1 vol.
St. Paul, Minn.—Board of Water Commrs. 1 pam.
Switzerland—Eidgen. hydrometrisches Bureau. 1 vol.
Tuttle, A. S. 3 pam., 21 phot.
U. S. Bureau of Forestry. 1 pam.
U. S. Bureau of Statistics. 1 bound vol.
U. S. Chickamauga & Chattanooga National Military Park Comm. 2 pam.
U. S. Chf. of Engrs. 6 pam., 60 specif.
U. S. Commr. of Education. 1 bound vol
U. S. Dept. of Agriculture. 2 pam.
U. S. Geological Surv. 2 bound vol., 3 pam.
U. S. Nautical Almanac Office. 2 bound vol., 3 pam.
U. S. Section of Foreign Markets. 1 pam.
U. S. Weather Bureau 1 pam.
Waltham, Mass.—Water Dept. 1 pam.
Wellington Harbour Board. 1 pam.
Western Ry. Club. 1 bound vol.

BY PURCHASE.

Die Gleichstrommaschine, Theorie, Konstruktion, Berechnung, Untersuchung und Arbeitsweise derselben. Von E. Arnold. Vol. I. Berlin, Julius Springer, 1902.

Hydraulic Power and Hydraulic Machinery. By Henry Robinson, M. Inst. C. E., M. I. M. E. Second Edition, Revised and Enlarged. London, Charles Griffin and Company, Limited, 1893.

The Balancing of Engines. By W. E. Dalby, M. Inst. C. E., M. I. M. E. New York, Longmans, Green and Co.; London, Edward Arnold, 1902.

The Steam Turbine. By Robert M. Neilson, Assoc. M. I. M. E. Longmans, Green and Co., London, New York and Bombay, 1902.

The Thermodynamics of Heat-Engines. By Sidney A. Reeve. New York, The Macmillan Company; London, Macmillan & Co., Ltd., 1903.

Die Geschichte des Eisens in technischer und kulturgeschichtlicher Beziehung. Von Dr. Ludwig Beck. Vol. V, Pt. 8. Braunschweig, Friedrich Vieweg, 1903.

Rand, McNally & Co.'s Indexed Atlas of the World. Historical–Descriptive–Statistical. 2 vol. Rand, McNally & Company, Chicago, New York, London, Berlin, copyright 1902.

The New Volumes of the Encyclopædia Britannica, constituting, in combination with the existing Volumes of the Ninth Edition, the Tenth Edition of that Work, and also Supplying a New, Distinctive, and Independent Library of Reference Dealing with Recent Events and Developments. Vols. I to VII, Forming Vols. XXV to XXXI of the Complete Work. Adam and Charles Black, London and Edinburgh, The Encyclopædia Britannica Company, New York, 1902.

Controle des Chemin de Fer et des Tramways. Par Jean de la Ruelle. Paris, Vve. Ch. Dunod, 1903.

The Trans-Siberian Route; or, Notes of a Journey from Peking to New York in 1902. By Clarence Cary. New York, The Evening Post Job Printing House, 1902.

Tracé et Terrassements. Tracé par P. Frick; Terrassements par J. L. Canaud. Paris, Vve. Ch. Dunod, 1903.

Calcareous Cements: Their Nature and Uses, with some Observations upon Cement Testing. By Gilbert R. Redgrave, Assoc. Inst. C. E. London, Charles Griffin and Company, Limited, 1895.

Slow Burning or Mill Construction. Report No. V of the Insurance Engineering Experiment Station. Boston, 1902.

SUMMARY OF ACCESSIONS.

From March 11th to April 7th, 1903.

Donations (including 355 duplicates)	886
By purchase	20
Total	906

MEMBERSHIP.

ADDITIONS.

MEMBERS.

		Date of Membership.
Brown, Baxter Lamont. Chf. Engr., St. L. Val. Ry., Room 72, Laclede Bldg., St. Louis, Mo.		April 1, 1903
Dakin, Albert Harlow, Jr. Asst. Engr., C. R. R. of N. J., 370 St. Nicholas Ave., New York City		April 1, 1903
Eno, Frank Harvey. Assoc. Prof. of Civ. Eng., Hayes Hall, Ohio State Univ., Columbus, Ohio		Mar. 4, 1903
Finley, William Henry. Prin. Asst. Engr., C. & N. Ry., Winnetka, Ill.		Feb. 4, 1903
Foss, Fred Eugene. Prof. of Civ. Eng., Pennsylvania State Coll., State College, Pa.		April 1, 1903
Knowles, Morris. Filtration Engr., City of Pittsburg; Civ. and Cons. Engr. (Chapin & Knowles), 1017 Frick Bldg., Pittsburg, Pa.	Jun. Assoc. M. M.	Oct. 4, 1892 Jan. 1, 1896 April 1, 1903
Porter, Henry Tegmeyer. Chf. Engr., Pitts., Bessemer & L. E. R. R. and West. Allegheny R. R., Greenville, Pa.		April 1, 1903
Sims, Clifford Stanley. Gen. Supt., B. & O. R. R., N. Y., Ft. of Whitehall St., New York City		April 1, 1903
Woods, Robert Patterson. Chf. Engr., Townsend, Reed & Co., Ry. Builders, 1208 Stevenson Bldg., Indianapolis, Ind.	Jun. Assoc. M. M.	Feb. 2, 1897 Mar. 7, 1900 April 1, 1903

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Mason, Francis. Care, Penn., N. Y. & L. I. R. R., 225 West 33d St., New York City	Jun. Assoc. M.	April 3, 1900 April 1, 1903
Mattair, Lewis Henry. Custom House, Chattanooga, Tenn.		Oct. 1, 1902
Shima, Takejiro. Imperial Government Ry., Shinbashi, Tokio, Japan		Mar. 4, 1903
Shoemaker, Marshall Ney. Vice Pres. and Phila. Mgr., Am. Concrete-Steel Co. (Res., 7236 Ridge Ave., Roxborough), Philadelphia, Pa.		April 1, 1903

JUNIORS.

Clausnitzer, John. Engr. Insp., Dept. of Highways, Brooklyn, 157 East 21st St., New York City		Mar. 3, 1903
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	Date of Membership.
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Seabury, George Tilley. Asst. Engr., Rapid Transit Subway Constr. Co., 1913 Amsterdam Ave., New York City	Mar. 31, 1903
True, Albert Lyman. The Owl's Nest, Cape Cottage, Me.	Sept. 2, 1902
Whitman, Ezra Bailey. 702 Fuller Bldg., New York City	Feb. 3, 1903

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Lockwood, Willard Datus............Care, Frodingham, Iron & Steel Works, Frodingham, near Doncaster, England.

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Steffens, William Frederick.........Care, A. T. Hardin, Engr., M. of W., N. Y. C. & H. R. R. R., 5 Vanderbilt Ave., New York City.

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JUNIORS.

Bassett, Robert Jay...................110 East 50th St., New York City.

Belcher, Wallace Edward............Niagara Falls Power Co., Niagara Falls, N. Y.

Belzner, Theodore....................Insp., Rapid Transit R. R. Comm., Sec. 3, 1st Div., 13 Astor Pl. (Res., 584 Lenox Ave.), New York City.

Cleaver, Pitson Jay...................445 Fifty-fifth St., Brooklyn, N. Y.

Day, Arthur Mortimer................149 West 44th St., New York City.

Henley, Robert Dwiggins Monteith...Asst. Engr., L. & N. R. R., Pensacola, Fla.

Hyatt, Caleb ....Pulver House, Ravena, N. Y.

Millard, Curtiss......................Pres. and Gen. Mgr., Peoria & Pekin Union Ry. Co., Peoria, Ill.

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Paine, George Hebard...............Cons. Engr., 83 Fulton St., New York City.

Perring, Henry Garfield............ Draftsman, Phil. Rap. Trans. Co., 134 North 50th St., Philadelphia, Pa.

Wenige, Arthur Emil.................Care, Bureau of Eng., Finance Dept., 280 Broadway, New York City.

Whitted, Levi Romulus...............Navy Yard, Charleston, S. C.

RESIGNATIONS.

MEMBERS.

	Date of Resignation.
Schenck, Archibald Alexander	March 31st, 1903

JUNIORS.

Gormly, Walter Bruce	March 1st, 1903

DEATHS.

Knowlton, Charles Andrews	Elected Member, October 2d, 1901; died March 2d, 1903.
Olney, Robert Blum	Elected Junior, January 3d, 1895; Associate Member, September 5th, 1900; died March 4th, 1903.
Taylor, William Johnston	Elected Fellow, May 10th, 1870; died Feb. 17th, 1903.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(April 8th to May 12th, 1903.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings*, Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
(7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine*, New York City, 25c.
(10) *Cassier's Magazine*, New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News*, New York City, 15c.
(14) *The Engineering Record*, New York City, 12c.
(15) *Railroad Gazette*, New York City, 10c.
(16) *Engineering and Mining Journal*, New York City, 15c.
(17) *Street Railway Journal*, New York City, 35c.
(18) *Railway and Engineering Review*, Chicago, Ill., 10c.
(19) *Scientific American Supplement*, New York City, 10c.
(20) *Iron Age*, New York City, 10c.
(21) *Railway Engineer*, London, England, 25c.
(22) *Iron and Coal Trades Review*, London, England, 25c.
(23) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal*, New York City, 10c.
(25) *American Engineer*, New York City, 20c.
(26) *Electrical Review*, London, England.
(27) *Electrical World and Engineer*, New York City, 10c.
(28) *Journal*, New England Water-Works Assoc., Boston, $1.
(29) *Journal*, Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
(31) *Annales de l' Assoc. des Ing. Sortis des École Spéciales de Gand*, Brussels, Belgium.
(32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
(33) *Le Génie Civil*, Paris, France.
(34) *Portefeuille Économique des Machines*, Paris, France.
(35) *Nouvelles Annales de la Construction*, Paris, France.
(36) *La Revue Technique*, Paris, France.
(37) *Revue de Mécanique*, Paris, France.
(38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
(39) *Railway Master Mechanic*, Chicago, Ill., 10c.
(40) *Railway Age*, Chicago, Ill., 10c.
(41) *Modern Machinery*, Chicago, Ill., 10c.
(42) *Transactions*, Am. Inst. Elec. Engrs., New York City, 50c.
(43) *Annales des Ponts et Chaussées*, Paris, France.
(44) *Journal*, Military Service Institution, Governor's Island, New York Harbor, 50c.
(45) *Mines and Minerals*, Scranton, Pa., 20c.
(46) *Scientific American*, New York City, 8c.
(47) *Mechanical Engineer*, Manchester, England.
(54) *Transactions*, Am. Soc. C. E., New York City, $5.
(55) *Transactions*, Am. Soc. M. E., New York City, $10.
(56) *Transactions*, Am. Inst. Min. Engrs., New York City, $5.
(57) *Colliery Guardian*, London, England.
(58) *Proceedings*, Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(59) *Transactions*, Mining Inst. of Scotland, London and Newcastle-upon-Tyne.
(60) *Municipal Engineering*, Indianapolis, Ind., 25c.
(61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburg, Pa.
(63) *Minutes of Proceedings*, Inst. C. E., London, England.
(64) *Power*, New York City, 20c.
(65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting*, London, England, 15c.
(67) *Cement and Engineering News*, Chicago, Ill., 25c.
(68) *Mining Journal*, London, England.

LIST OF ARTICLES.

Bridge.

Essentials Necessary for Successful Practice in Bridge Engineering. J. E. Greiner, M. Am. Soc. C. E. (Extracts from lecture delivered before students of Cornell Univ.) (13) Apr. 9.

The Rio Grande Bridge of the El Paso & Southwestern R. R. near El Paso, Tex.* R. A. Thompson. (13) Apr. 9.

The Des Moines River Viaduct of the Mason City & Fort Dodge R. R., at Fort Dodge, Ia.* H. C. Keith. (13) Apr. 9.

New Railway Bridge over the Tyne.* (12) Apr. 10.

Types and Details of Bridge Construction.* Frank W. Skinner. (14) Serial beginning Apr. 11.

Theory and Calculation of the Two-Hinged Spandrel-Braced Arch. Alex. Rice McKim. (14) Apr. 11.

Drawbridge Calculations. Edward Godfrey. (13) Apr. 16.

The Paderno Viaduct, Italy.* (12) Serial beginning Apr. 17.

The Ouachita River Bridge, Missouri Pacific Railway.* (40) Apr. 17.

A Steel Truss Highway Bridge with Concrete Floor.* (14) Apr. 25.

Erection of the Manhattan Approaches to the Williamsburg Bridge.* (14) May 9.

Le Viaduc du Viaur (Ligne de Carmaux à Rodez).* R. Godfernaux. (30) Apr.

Electrical.

The Arcophone. R. A. L. Snyder. (42) Mar.

Telephone Service. S. J. Larned. (4) Apr.

The Development, Equipment and Operation of the Sub-Stations and Distributing Systems of the Chicago Edison Co. and Commonwealth Electric Co. Ernest F. Smith. (4) Apr.

Grounding of Alternate Current Systems. Geo. N. Eastman. (4) Apr.

The Engineering of Illumination.* Van Rensselaer Lansingh. (4) Apr.

Electricity Works of Tunbridge Wells.* (26) Apr. 3.

On the Application of Three-Phase Motors to the Electrical Driving of Workshops and Factories.* A. C. Eborall. (29) Apr. 3.

Laboratory Electric Furnace Equipment, Owens College, Manchester, England.* (27) Apr. 4.

Electrical Manufacture of Steel in Sweden.* G. Lindman. (27) Apr. 4.

Electrical Extensions at Willesden. (12) Serial beginning Apr. 10.

Sheet Steel for Static Transformers. Walter S. Moody. (27) Apr. 11.

De Forest Wireless Telegraph System. A. Frederick Collins. (27) Apr. 11.

Wireless Telegraphy in the United States. E. Guarini. (26) Serial beginning Apr. 17.

Some Notes on Electrically Driven Winding Engines.* (57) Apr. 17.

Vancouver Transmission Plant.* Wyatt H. Allen. (27) Apr. 18.

The Lodge-Muirhead System of Wireless Telegraphy.* H. C. Fyfe. (46) Apr. 18.

Insulating Materials: A Field for the Chemist. Max von Recklinghausen. (Paper read before the Amer. Electrochemical Soc.) (13) April 23.

Electric Safety Fuses. (26) Apr. 24.

The Development of Marconi's System of Wireless Telegraphy.* Emile Guarini. (19) Serial beginning Apr. 25.

Telephone Exchanges.* Arthur V. Abbott. (27) Serial beginning April 25.

Corrosion of Metals by Electrolysis. A. A. Knudson. (Abstract of paper read before the Amer. Electrochemical Soc.) (27) Apr. 25.

Development in Telephone Switchboard Equipment at Bloomington, Ill.* (27) Apr. 25.

Core Type Transformers.* (27) Apr. 25.

General Specifications for the Construction of Telephone Aerial Lines.* (27) Apr. 25.

The Telegraphone and the British Post-Office.* Herbert C. Fyfe. (46) Apr. 25.

The Cascade Water, Power and Light Co., Cascade, B. C., Canada. W. G. McConnon. (27) Apr. 25; (18) Apr. 25; (14) May 2.

Notes on Recent Electrical and Scientific Developments Abroad.* William J. Hammer. (3) Serial beginning May.

Small Water Powers with High Heads for Electric Lighting.* Thoburn Reid. (10) May.

The Central Avenue Power Station (Kansas City).* H. S. Badger and G. E. Schreiber. (64) May.

The Motive Power of the Future.* Horace D. B. How. (Abstract of paper read before the South Wales Inst. of Engrs.) (22) May 1.

The New Aberdeen Electricity Works.* (26) May 1.

Electricity Supply for Small Towns and Villages. (47) May 2.

The New Brussels Telephone Exchange.* (27) May 2.

The Blondel Oscillograph.* (27) May 2.

Electrical Equipment of the Farmer's Bank Building, Pittsburg.*, L. L. Emerson. (14) May 9.

A Twenty-Ton Switching Electric Storage Battery Locomotive.* (16) May 9.

Improvements in the Du Bois Electric & Traction System.* (17) May 9.

The Arnold-Bragstad-La Cour Polycyclic Power Transmission System.* O. S. Bragstad. (27) May 9.

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* Illustrated.

Electrical—(Continued).

La Dactyle Électrique.* O. Rochefort. (32) Feb.

Note sur les Installations Hydro-Électriques de Rheinfelden, de Zurich et de Schwyz, en Suisse.* G. Herman. (30) Apr.

Fonctionnement de l'Éclairage Électrique sur les Réseaux de Traction. Maurice Soubrier. (36) Serial beginning April 10.

Marine.

On the Effect of Modern Accessories on the Size and Cost of Warships. W. H. Whiting. (Paper read before the Inst. of Naval Archts.) (12) Apr. 3; (11) Apr. 3.

On the "Lines" of Fast Cruisers.* C. C. P. FitzGerald. (Paper read before the Inst. of Naval Archts.) (11) Apr. 3.

Carbonic Anhydride Refrigerating Machinery for Marine Use.* S. H. Bunnell. (13) Apr. 9.

The Naval Boiler Problem: Test of the Hohenstein Boiler.* John Halligan, Jr. (From the *Journal* of the Amer. Soc. of Naval Engrs.) (13) Apr. 9.

The Screw as a Means of Propulsion for Shallow-Draft Vessels.* A. F. Yarrow. (Paper read before the Inst. of Naval Archts.) (12) Apr. 10; (11) Apr. 10.

The Ljungström Condenser as Applied to Marine Engines. William Cross. (Paper read before the Inst. of Naval Archts.) (12) Apr. 3; (11) Apr. 17.

The Ballasting of Steamers for North Atlantic Voyages.* S. J. P. Thearle. (11) Apr. 17.

Screw Steamer for Towing, Salvage and Fire Purposes.* (11) Apr. 17.

The Italian First-Class Battleship *Benedetto Brin.** (12) Apr. 17.

Results of a Naval Inquiry as to Which is the Most Powerful Armor-Clad Afloat. (19) Apr. 18.

Corrosion in Metal Pipes on Board Ship. A. W. Stewart. (Paper read before the Inst. of Naval Archts.) (11) Apr. 24.

Marine Installations for the Carriage of Refrigerated Cargoes.* R. Balfour. (Paper read before the Inst. of Naval Archts.) (12) Apr. 24.

Les Machines du Croiseur Protégé Russe *Bogatyr.** (36) Apr. 10.

Mechanical.

On the Use of Beaumont Oil as a Fuel. Henry H. Humphrey. (1) Mar.

The Handling and Storing of Iron Ore. Charles Piez. (2) Apr.

The Slip of Belts. J. Stormonth. (12) Apr. 3.

The Valuation of Coals. E. L. Rhead. (22) Apr. 3.

Coking Badly Caking Coal: A New Mechanical Process.* (22) Apr. 3.

Slotting and Drilling Machines.* Thomas R. Shaw. (47) Serial beginning Apr. 4.

Power Production by Gas Producers and Engines.* Robert W. A. Brewer, A. M. I. C. E. (Paper read before the Civil and Mechanical Engrs. Soc.) (47) Serial beginning Apr. 4.

Carbonic Anhydride Refrigerating Machinery for Marine Use.* S. H. Bunnell. (13) Apr. 9.

Blooming Mill of the Röchling Iron and Steel Works. (11) Apr. 10.

The Curtis Steam Turbine.* W. L. R. Emmet. (Paper read before the Amer. Philosophical Soc.) (17) Apr. 11; (27) Apr. 11; (64) May; (18) May 2; Extracts (14) Apr. 11.

The Locomobile Gasoline Car.* (46) Apr. 11.

The Mond Power-Gas Process.* (66) Apr. 14.

Queen's Engineering Works, Bedford.* (26) Apr. 17.

Power Plant for the New Government Building at San Francisco.* (14) Apr. 18.

The Design and Testing of Centrifugal Fans.* W. Gilbert, A. M. I. C. E. (Paper read before the Civil and Mechanical Engrs. Soc.) (22) Apr. 24; (47) Serial beginning Apr. 18.

The Pedrail—A New Type of Road Locomotive.* Herbert C. Fyfe. (46) Apr. 18.

Some Special and Peculiar Types of Vertical Boilers.* William H. Fowler, M. Inst. C. E. (47) Apr. 18.

Transmission of Power by Compressed Air. W. C. Popplewell, A. M. Inst. C. E. (47) Apr. 18.

Gas Manufacture for 1903 at the Old Kent Road. (66) Apr. 21.

Moving a 110-Ft. Steel Chimney.* (13) Apr. 23.

Measuring the Power Required for Sheet Rolling Mills. H. G. Manning, M. Am. Soc. M. E. (13) Apr. 23.

Chill Rolls; The Problems of Their Manufacture and Use. B. E. V. Luty. (20) Serial beginning Apr. 23.

Machinery for the Panama Canal.* Waldon Fawcett. (62) Apr. 23.

Wind-Engines at the Royal Agricultural Society's Ground, Ealing.* (11) Apr. 24.

Modern Development of the Steam Turbine.* Frank C. Perkins. (46) Apr. 25.

Blue Water Gas and Its Enrichment by the Peebles Oil Gas Process.* E. J. Brockway. (Paper read before the Eastern Counties Gas Mgrs. Assoc.) (66) Apr. 28.

A Chain with Detachable Links.* (13) Apr. 30.

The New Works of the American Turret Lathe Mfg. Company.* (20) Apr. 30.

The Manufacture of Slag Bricks and Slag Blocks. Edwin C. Eckel, Assoc. Am. Soc. C. E. (13) Apr. 30.

Liquid Fuel for Power Purposes. Arthur L. Williston. (9) May.

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* Illustrated.

Mechanical—(Continued).

Modern American Machine Tools, from the Standpoint of a Designer.* Charles H. Benjamin. (10) May.

Distributing Illuminating Gas at High Pressure: Some Examples from American Practice. F. H. Shelton. (10) May.

Valve Gear of the Porter-Allen Engine.* (64) May.

The Cotton Oil Industry in America.* D. A. Tompkins. (10) May.

Recent Steam Turbine Applications, with Data of Performances.* G. L. Parsons. (10) May.

Layout of Corliss Valve Gears.* Sanford A. Moss. (64) Serial beginning May.

The Hult Rotary Steam Engine.* (26) May 1.

The New Armour-Plate Mill at Creusot.* (11) May 1.

The Royal Agricultural Society's Windmill Trials.* (12) May 1.

Producer Gas. A. Humboldt Sexton. (47) Serial beginning May 2.

The Manufacture and Properties of Hollow Pressed Steel Car Axles.* Camille Mercader. (Paper read before the Iron and Steel Inst.) (20) Serial beginning May 7; (40) May 8; (18) May 9; Abstract (13) May 7.

Petroleum and Petroleum Lubricants. William F. Parrish, Jr. (Paper presented before the New England St. Ry. Club.) (17) May 9.

The Use of Reheaters in Compound Engines. (14) May 9.

A Double Drum Boiler.* (14) May 9.

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The Krupp Works at Essen.* Day Allen Willey. (19) Serial beginning May 9.

L'État Actuel de Nos Connaissances sur la Constitution des Aciers au Carbone. Léon Guillet. (33) Serial beginning Apr. 4.

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Military.

The Springfield Magazine Rifle, Model 1903.* (44) May-June.

Mining.

Electrical Coal-Cutting Machines.* Fredk. W. Hurd. (59) Vol. xxv, Pt. 3.

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A New Ventilating Fan and Engine at Littleton Colliery, Cannock.* (22) Apr. 3.

Outbursts of Firedamp in Mines. (57) April 3.

Central Electric Power Stations for Gold Mines. J. W. Kirkland. (Paper read before the Mech. Engrs. Assoc. of the Witwatersrand.) (47) Apr. 4.

Mining Methods on the Klondike.* Eugene Haanel. (16) Apr. 11.

Diamond Drilling. J. N. Justice. (Abstract of paper read before the Inst. of Mining and Metallurgy.) (22) Apr. 24.

Systematic Timbering in Continental Mines.* (57) Serial beginning Apr. 24.

Hoisting from Great Depths. Hans C. Behr. (16) Serial beginning Apr. 25.

Miner's Phthisis and Dust in Mines. William Cullen. (16) Apr. 25.

Chain and Pick Coal Cutting Machines.* H. S. Johnson. (16) Apr. 25.

The Daft and Williams System of Electrical Prospecting for Mineral Ores.* (27) Apr. 25.

The Stewart River Gold Dredge.* A. W. Robinson. (Paper read before the Canadian Mining Inst.) (68) Apr. 25; (16) May 2.

A Practical System of Mine Accounting. E. Jacobs. (9) May.

The Weir-Pittsburg District of the Kansas Coal Field.* W. R. Crane. (45) May.

Electric Mining Drills.* (45) May.

Present Practice in Gold Dredging. (45) May.

Third-Rail Tail-Rope Haulage System.* (45) May.

Timbering in the Collieries of Saxony and Austria.* (22) May 1.

Electricity in Mines.* (57) May 1.

A Modern Method of Coal Washing.* C. A. Meissner. (Paper read before the Nova Scotia Mining Soc.) (16) May 9.

The Edison Dry Process for the Separation of Gold from Gravel.* Cloyd M. Chapman. (16) May 9.

Miscellaneous.

The Engineering of Illumination.* Van Renssellaer Lansingh. (4) Apr.

The "State of the Art" in Patent Cases. H. Bovie Schermerhorn. (2) Apr.

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* Illustrated.

Miscellaneous—(Continued).

Engineering Work on the Louisiana Purchase Exposition at St. Louis.* (13) Apr 23.
The Louisiana Purchase Exposition at St. Louis: The Present Status.* (20) Apr. 23.
The Education of Engineers in America, Germany and Switzerland. W. E. Dalby. (Paper read before the Inst. of Mech. Engrs.) (11) May 1.

Municipal.

Portland Cement Sidewalk Construction. (67) Serial beginning Apr.
The Misuse of Public Sidewalk Areas and Vaults. Reginald Pelham Bolton, M. Am. Soc. C. E. (14) Apr. 18.
A Defense of the High Prices for Street Lighting in New York, and a Reply Thereto. (13) Apr. 23.
The Dirt Road. G. A. Roullier, M. Am. Soc. C. E. (14) Apr. 25.
Coal-Tar Pavements in Northern New England. (14) Apr. 25.
Road Laws of Illinois. Ira O. Baker. (14) Apr. 25.
Massachusetts State Highways.* A. B. Fletcher. (14) Apr. 25.
State Highway Laws of New Jersey. (14) Apr. 25.
New York State Aid Road Laws. (14) Apr. 25.
Road Construction and Maintenance in Europe. (14) Apr. 25.
The Use of Oil on Roads. Hiram M. Chittenden. (13) Apr. 23; (14) Apr. 25.
A Few Thoughts on Present Practice of Road Construction. James Owen, M. Am. Soc. C. E. (14) Apr. 25.
Progress of Steel Roads. Roy Stone. (14) Apr. 25.
New Methods of Road Construction. Fred J. Warren. (14) Apr. 25.
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Improved Maintenance of Earth Roads.* Henry P. Morrison, M. Am. Soc. C. E. (14) May 2.
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Railroad.

Pittsburgh—Her Waterways and Her Railways. Antes Snyder. (58) Feb.
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An Electric Car Lighting System.* W. L. Bliss. (42) Mar.
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Heating and Ventilating of Railroad Shops. J. I. Lyle. (65) Mar.
Electric Railways.* H. M. Brinckerhoff. (4) Apr.
The Third Rail for High Speed Electric Service. Ernest Gonzenbach. (4) Apr.
A Caledonian Locomotive Giant.* Charles Rous-Marten. (12) Apr. 3.
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Four Cylinder Compounds in Europe.* Reginald Gordon. (15) Apr. 10.
Proposed Design of Locomotive Valves for High Speeds. J. V. N. Cheney. (15) Apr. 10.
Santa Fé Work on China Basin (San Francisco.)* (40) Apr. 10.
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The Cincinnati, Georgetown & Portsmouth Railroad.* (14) Apr. 18.
New Erie Terminals at Jersey City and New York.* (15) Apr. 24.
The Milan-Varese-Porto-Ceresio Electric Railway.* (26) Apr. 24.
The General Arrangement of Railroad Repair Shops.* (40) Apr. 24.
The Greater Wabash: A General Account of the New Construction Extending the Wabash to Pittsburg and the Coast.* (40) Apr. 24.
Rockford, Beloit & Janesville Railroad—Power Plant, Operation and Equipment.* (17) Apr. 25.
The Locomotive Steel Frame and Its Repairs. A. W. McCaslin. (Paper presented before Ry. Club of Pittsburg.) (18) Apr. 25.
The Great Eastern Railway "Decapod."* James Holden, M. Inst. C. E. (10) May.
Railway Trains on Ferries: The Cross Channel Passage.* Archibald S. Hurd. (10) May.
Steel Cars on the Bessemer & Lake Erie Railroad.* (25) May.
Tandem Compound Freight Locomotive. New York Central and Hudson River Railroad.* (25) May.
Freight Locomotive; Chicago, Rock Island & Pacific Railway.* (39) May.
Automatic Block Signals, C. M. & St. P. Railway.* W. H. Elliott. (40) May 1; (15) May 1.
Automatic Couplers on British Railways.* T. A. Brockelbank. (29) May 1.
Extension of Clapham Junction Station; London & Southwestern Railway.* (12) May 1.
Decapod Tank Locomotive for the Great Eastern Railway of England.* (40) May 1.

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The Lackawanna Telephone System.* (40) May 1.
Fort Wayne Shop Improvements.* (15) May 1.
Frisco System Standard Roundhouse Arrangement.* (18) May 2.
The Seattle-Tacoma Interurban Railway.* Howard S. Knowlton. (17) May 2.
The Manufacture and Properties of Hollow Pressed Steel Car Axles.* Camille Mercader. (Paper read before the Iron and Steel Inst.) (20) Serial beginning May 7; (40) May 8; (18) May 9; Abstract (13) May 7.
Developments in St. Louis Terminal Facilities.* (18) May 9.
Gulf & Ship Island Ry. Shops.* (18) May 9.
Note sur la Locomotive Compound à 4 Cylindres de la Compagnie des Chemins de Fer de Jura-Simplon.* Camille Barbey. (38) Apr.
Quadricycle et Wagonette à Pétrol pour la Circulation sur les Lignes de Chemins de Fer.* L. Pierre Guédon. (33) Apr. 18.
Attelage Automatique des Wagons.* G. Mareschal. (33) Apr. 25.
Étude sur les Freins. E. Billy and H. Noalhat. (36) Serial beginning Apr. 25.

Railroad, Street.

Rapid Transit in New York. Robert P. Porter. (11) Apr. 10.
The East Boston Tunnel.* (15) Apr. 10.
Car Shops of the Rochester Railway.* (17) Apr. 11.
Ventilation of Street Cars.* (17) Apr. 11.
Subway Structures of the Philadelphia Rapid Transit Company.* (14) Apr. 18.
New Power Plans of the United Railways of San Francisco.* (17) Apr. 18.
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The Electrification of the Mersey Railway.* (11) Apr. 24.
The Surface Contact Tramways at Wolverhampton.* (12) Apr. 24.
Philadelphia Rapid Transit Plans.* (15) Apr. 24.
Locomotion and Transport in London.* Edward Davy Pain. (15) Apr. 24.
Ohio Central Traction System.* (17) Apr. 25.
Working Drawings for an Electric Flat Car.* Arthur B. Weeks. (17) Apr. 25.
The Construction of Semi-Convertible Cars.* (17) Apr. 25.
The Whitechapel and Bow Railway.* (11) Serial beginning May 1.
Power Plant of the Worcester & Blackstone Valley Street Railway Company.* (14) May 2.
Types of Car Tracks for City Streets.* (14) May 2.
Conduit Construction in Brussels.* (17) May 2.
Improvements in the Du Bois Electric & Traction System.* (17) May 9.
Equipment of Yerkes' London Underground Railways.* (17) May 9.
Noiseless Railway Crossings.* (17) May 9.
Le Métropolitain de Paris.* A. Dumas. (33) Serial beginning Mar. 28.
Le Chemin de Fer Métropolitain de Paris: Ligne Circulaire Nord par les Boulevards Extérieurs.* Raymond Godfernaux. (38) Apr.

Sanitary.

Sewer System for Indiana Harbor, Indiana.* (14) Apr. 11.
The New Septic Tanks and Bacterial Contact Beds at Exeter, England.* (13) Apr. 16.
Ventilation and Heating in Rockefeller Hall, Vassar College.* (14) Apr. 25.
Excavations for Sewerage Purposes and Unaccounted for Gas: An Experience. E. G. Smithard. (Paper read before the Eastern Counties Gas Mgrs. Assoc.) (66) Apr. 28.
Ventilating and Heating in the New Government Building at San Francisco.* (14) May 2.

Structural.

On the use of Influence Lines in Graphic Statics.* Myron S. Falk. (6) Jan.
Paint. Houston Lowe. (61) Mar.
Rock Asphalt and Asphalt Mastic. Henry Wiederhold. (2) Apr.
Apparatus for and Methods of Treating Wood, to Protect it from Fire and Preserve it from Decay. Joseph L. Ferrell. (2) Apr.
Manufacture of Cement from Marl and Clay.* Henry S. Spackman. (2) Apr.
A Proposed New System of Building Retort-Houses. (66) Serial beginning Apr. 7.
A 165-Ft. Concrete Chimney.* James D. Schuyler, M. Am. Soc. C. E. (14) Apr. 11.
Concrete Pile Foundations of the Hallenbeck Building, New York.* (14) Apr. 11.
Comparative Tests of Limestone and Gravel Screenings and Torpedo Sand for Concrete. G. J. Griesenauer. (13) Apr. 16.
Official Report on Preservation of Structural Steel in a Tall New York Building.* (14) Apr. 18.
Notes on the Treatment of Timber. S. W. Labrot. (18) Apr. 18.
The Dome Framing of the Chicago Post Office Building.* (13) Apr. 23.
Recent Advances in the Standardization of Steel Specifications. (20) Apr. 30.
Portland Natural and Puzzolan Cements: An Introductory Paper. Edwin C. Eckel. (60) May.
Difficult Supports for Underpinning.* (14) May 2.

Topographical.

Notes on the Use of Stadia Lines in Surveying Instruments. H. Dennis Taylor. (11) Apr. 17.

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* Illustrated.

Water Supply.

Rainfall on the Pacific Coast of North and South America and the Factors of Water Supply in California. Marsden Manson. (1) Mar.

A Norwegian Water Power Plant.* Franz Köster. (27) Apr. 4.

Water Tower, Westinghouse Works, Manchester.* (12) Apr. 10.

Six Niagara Power Installations under Way: A Million Horse Power to be Developed at Niagara Falls.* Frank C. Perkins. (27) Apr. 11.

The Marlborough Brook Filter Beds.* Walter W. Patch. (13) Apr. 15.

Mechanical Filter Plant of the East Jersey Water Co., Little Falls, N. J.* (13) Apr. 16.

The Pittsburg System of Water Purification.* (40) Apr. 17.

Further Investigations of Water Waste in New York City. (13) Apr. 9; (14) Apr. 18.

Vancouver Transmission Plant.* Wyatt H. Allen. (27) Apr. 18.

A Water-Works Appraisal at Mobile, Ala. (13) Apr. 23.

A Prony Brake Test of a Horizontal Turbine for the Bates Mfg. Co., Lewiston, Me.* William O. Webber, M. Am. Soc. M. E. (13) Apr. 30.

The Cost of Diamond Drill Borings in the Colorado River Valley and at St. Mary's Lake, Montana. A. P. Davis. (13) Apr. 30.

The Cascade Water, Power and Light Co., Cascade, B. C., Canada. W. G. McConnon. (27) Apr. 25; (18) Apr. 25; (14) May 2.

The Water Power Development at Chaudière Falls, P. Q.* (13) May 7.

The Wigwam Reservoir Masonry Dam of the Water-Works of Waterbury, Conn.* R. A. Cairns, M. Am. Soc. C. E. (13) May 7.

Recording Pressure Gauges as Aids in Water-Works Management. A. O. Doane. (14) May 9.

Biological and Chemical Laboratories of the Water Department of New York City. George C. Whipple. (14) May 9.

Note sur les Installations Hydro-Électriques de Rheinfelden, de Zurich et de Schwyz, en Suisse.* G. Herman. (30) Apr.

Le Laboratoire d'Hydraulique Fluviale de Carlsruhe.* (35) Apr.

Les Barrages d'Assouan et d'Assiout.* (35) Serial beginning Apr.

Les Eaux de Bruxelles en 1902. (36) Apr. 10.

L'Épuration des Eaux par l'Ozonisation.* Albert Reyner. (36) Apr. 25.

Waterways.

Pittsburgh—Her Waterways and Her Railways. Antes Snyder. (58) Feb.

Improved Waterway Necessary for Commercial Outlet (Pittsburgh). W. B. Rodgers. (58) Feb.

Personal Experiences in the Construction of a Landing Pier for the Ocos Railway, Guatemala, C. A.* Charles List. (1) Mar.

Foundation for Coal Pocket at Lincoln Wharf. Boston Elevated Railway Co.* Robert B. Davis, M. Am. Soc. C. E. (1) Mar.

Methods and Costs of Pile Pulling and Pile Blasting.* (13) Apr. 16.

Tidal Waves, Seaquakes and Storm Waves. W. H. Wheeler, M. Inst. C. E. (12) Apr. 17.

Damming the Niagara River at Buffalo.* J. H. Massie. (14) Apr. 18.

River Training in the Punjab.* F. J. E. Spring. (Extracts from paper in *Indian Engineering.*) (18) Apr. 25.

The Stewart River Gold Dredge.* A. W. Robinson. (Paper read before the Canadian Mining Inst.) (68) Apr. 25; (16) May 2.

The New 30-In. Hydraulic Dredge for the Port of Portland, Oregon.* (13) Apr. 30.

Electric Haulage on Canals.* (26) May 1.

English Shipping Appliances for Coal.* (15) May 1.

Note sur l'Amélioration de l'Embouchure du Rupel.* Octave Mavant. (31) Part iv, 1902.

Les Travaux de Rectification de l'Ourthe en Cours d'Exécution entre Chênée et Liége. Em. Jacquemin. (30) Apr.

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* Illustrated.

Vol. XXIX. AUGUST, 1903. No. 6.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

June 3d, 1903.—The meeting was called to order at 8.45 P. M., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 99 members and 15 guests.

The minutes of the meetings of May 6th and 20th, 1903, were approved as printed in *Proceedings* for May, 1903.

A paper entitled "A New Safety Explosive," by Richard T. Dana, Assoc. M. Am. Soc. C. E., was presented by the author. The subject was discussed by A. McL. Parker, M. Am. Soc. C. E., and the author.

John F. Jackson, Assoc. M. Am. Soc. C. E., described informally the construction of some steel-faced dams recently built in the West.

Ballots for membership were canvassed, and the following candidates elected:

AS MEMBERS.

Frank Hooker Alfred, Detroit, Mich.
Willard Lewis Bowker, Portsmouth, N. H.
Edward Du Bois Brown, New York City.
Charles Walter Bryan, New York City.
George Calbraith Clarke, Pittsburg, Pa.
Lewis Augustus Dunham, Kansas City, Mo.
John Meiggs Ewen, Chicago, Ill.
Stetson George Hindes, San Francisco, Cal.
Frank Clifton Kimball, Knoxville, Tenn.
Charles List, San Francisco, Cal.
Wilfred Gillette McConnel, Guantanamo, Cuba.
Edward Furber Miller, Newton Center, Mass.
Henry Hobart Porter, Jr., New York City.
George Rockwell Putnam, Manila, Philippine Islands.
Robert Ridgway, New York City.
Jesse Supplee, Erie, Pa.
Ingvart Teilman, Fresno, Cal.
Thomas William Townsend Tuckey, Tangku, North China.

AS ASSOCIATE MEMBERS.

Dorsey Ash, Salt Lake City, Utah.
Shirley Baker, San Francisco, Cal.
George Heckman Burgess, Pittsburg, Pa.
Richard George Doerfling, San Francisco, Cal.
John Turney Fetherston, New Brighton, N. Y.
William Hayden Ford, Philadelphia, Pa.
Charles Newton Green, New York City.
Loren Edward Hunt, Berkeley, Cal.
Arthur Price Law, Bridgeport, Conn.
Thomas R Lawson, Troy, N. Y.
George Stevens Leavenworth, Fairmont, W. Va.
John Brown Lindsey, Jr., Talladega, Ala.
George Kerr Little, Tuscaloosa, Ala.
John Grant MacGregor, Louisville, Ky.
Charles Ephraim McCoy, Lowsville, W. Va.
Castle Prentice Moss, New Westminster, B. C., Canada.
Colone Will Jackson Neville, Chicago, Ill.
George Volney Rhines, Toledo, Ohio.
Felix Charles Stehle, Wissahickon, Pa.
Thomas Corwin Strawn, Hoboken, N. J.

Robert Swan Sumner, Alamogordo, N. Mex.
Arthur Warren Tidd, New York City.
Emanuel Louis Verveer, New York City.
Irvine Watson, Wheeling, W. Va.

The Secretary announced the election of the following candidates by the Board of Direction on June 2d, 1903:

As Associate.

John MacGregor, Baltimore, Md.

As Juniors.

William Brokaw Bamford, Trenton, N. J.
Max Lee Cunningham, Shawnee, Okla.
Frederick Fischer Pillet, Mobile, Ala.
Jacob Schmitt, Brooklyn, N. Y.
Jesse Russell Taft, Albany, N. Y.

The Secretary announced the following deaths:

Benjamin Franklin Jones, elected Fellow June 1st, 1870; died May 19th, 1903.

Henry Grant Morse, elected Member April 7th, 1880; died June 2d, 1903.

Adjourned.

THIRTY-FIFTH ANNUAL CONVENTION, HELD AT ASHEVILLE, N. C., JUNE 9th, 10th, 11th and 12th, 1903.

Opening Session, Tuesday, June 9th, 1903.—The meeting was called to order at 2.30 P. M., by J. L. Ludlow, M. Am. Soc. C. E., Chairman of the Local Committee.

The Chairman introduced General Theodore F. Davidson, who, in a brief speech, welcomed the Society to Asheville and the State of North Carolina.*

The President, Alfred Noble, M. Am. Soc. C. E., after replying to the address of welcome, took the chair and opened the business meeting.

BUSINESS MEETING.

President Alfred Noble in the chair; Chas. Warren Hunt, Secretary.

The Secretary stated that, as it had been practically understood at previous business meetings that the Annual Convention of 1904 should be held at St. Louis during the Louisiana Purchase Exposition, the customary ballot, asking members to state their preferences as to the place of holding the Convention, had not been sent out.

In reference to holding the next Convention at St. Louis, the Secretary read letters of invitation from Messrs. D. R. Francis, President, Louisiana Purchase Exposition; C. P. Walbridge, President, Business Men's League; Rolla Wells, Mayor of St. Louis; and J. A. Ockerson, M. Am. Soc. C. E.†

On motion, duly seconded, the matter was referred to the Board of Direction with power.

The Secretary read the proposed amendment to the Constitution.‡

It was moved by J. J. R. Croes, Past-President, Am. Soc. C. E., that a third clause be added to Section 1 of Article III, as follows:

"All members other than Honorary Members and Juniors shall be admitted to the Society only by vote of the Corporate Members as hereinafter specified "

The motion, being duly seconded, was carried.

Mr. Croes moved that the second paragraph of Section 3, Article III, be amended so as to read:

"The Board shall have the power to elect persons to the grade of Junior, and to transfer persons from any grade except that of Junior to a higher grade of membership, and shall notify the membership of its action."

The motion, being duly seconded, was carried.

The Secretary presented a communication from James Burden,§ Assoc. M. Am. Soc. C. E., relative to the age at which Juniors shall cease to be connected with the Society; and, at Mr. Burden's request, offered as an amendment that the age be changed from thirty to thirty-five years, which was seconded.

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* See page 206.
† For copies of these letters see pages 210-211.
‡ See page 211.
§ See page 217.

As a further amendment, Henry B. Seaman moved that the age be fixed at thirty-two, which amendment was accepted by the Secretary, acting for Mr. Burden.

After discussion, the motion, being put, was carried.

The Secretary presented a letter from Samuel Whinery,* M. Am. Soc. C. E., relating to the proposed amendment to the Constitution, and it was moved and seconded that the following paragraph be placed at the end of Section 4 of Article III:

"A rejected applicant may renew his application for membership at any time after the expiration of one year from the date of the ballot rejecting his previous application."

After discussion, the motion, being put, was carried. The President then announced that the proposed amendment as amended would be sent out for letter-ballot in accordance with the Constitution.

The proposed amendment, as amended, is as follows:

Amend the Constitution by striking out Sections 6, 7 and 8 of Article II, and the whole of Article III, and substituting therefor the following:

ARTICLE II.—MEMBERSHIP.

* * * * * * * *

6.—A Junior shall not be less than eighteen years of age, and his connection with the Society shall cease when he becomes thirty-two years of age, unless he be previously transferred to another grade. He shall have had active practice in some branch of engineering for at least two years, or he shall have graduated from a school of engineering of recognized standing. Persons who are in the Junior class at the time of the adoption of this Constitution shall not have their status changed by the provisions of this section.

7.—Honorary Members shall be chosen only from persons of acknowledged eminence in some branch of engineering or the sciences related thereto. There shall not be more than twenty at any one time.

8.—Fellows shall be contributors to the permanent funds of the Society, though they may not be eligible for admission as Corporate Members.

ARTICLE III.—ADMISSIONS AND EXPULSIONS.

1.—Honorary Members shall be proposed by at least ten members, and shall be elected only by a unanimous vote of the Board of Direction. A Past-President, or a member of the Board of Direction proposed for Honorary Membership, shall not be required to vote either for or against his own admission.

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* See page 219.

A person elected an Honorary Member shall be promptly notified thereof by letter. The election shall be cancelled if an acceptance is not received within six months after the mailing of such notice.

All members other than Honorary Members and Juniors shall be admitted to the Society only by vote of the Corporate Members, as hereinafter specified.

2.—An application for admission to the Society or for transfer from one grade to another shall embody a concise statement, with dates, of the candidate's professional training and experience; and shall be in a form and in such detail as may be prescribed by the Board of Direction. It shall be signed by the applicant, and shall contain a promise to conform to the requirements of membership, if elected. The applicant shall furnish the names of at least five Corporate Members to whom he is personally known. Each of these shall be requested by the Secretary to address a letter to the Board of Direction, on a form prescribed by said Board, stating the extent of the writer's personal knowledge of the applicant and of his professional work. If at least five of the Corporate Members named as references do not furnish the requisite endorsement, the Secretary shall call upon the applicant for additional names, and not until written communications shall have been received from at least five Corporate Members shall the application be considered by the Board.

Applications of engineers not resident in North America, and who may be so situated as not to be personally known to five Corporate Members, may be recommended for ballot by five members of the Board of Direction, after having secured evidence sufficient, in their opinion, to show that the applicant is worthy of admission.

3.—At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all new applications received for admission or for transfer, which list shall be dated and shall contain a concise statement of the record of each applicant and the names of his references, with a request that members transmit to the Board any information in their possession which may affect the disposition of the applications. Not less than twenty days after the issue of such list, the Board of Direction shall consider these applications, together with any information in regard to the applicants that may have been received; may make further inquiries, if deemed expedient; shall classify the applicant with his consent, and on application for admission may direct a ballot.

The Board shall have the power to elect persons to the grade of Junior, and to transfer persons from any grade except that of Junior to a higher grade of membership, and shall notify the membership of its action.

4.—The ballots shall be letter-ballots, in a form to be prescribed by the Board of Direction. They shall be mailed to each Corporate Member whose address is known, and shall state the date on which the ballot is to be canvassed, which shall be not less than twenty days after the issue of the ballot. Twenty or more negative votes shall exclude from election. In case of exclusion, no notice thereof shall be entered on the minutes, but the candidate shall be notified.

A rejected applicant may renew his application for membership at any time after the expiration of one year from the date of the ballot rejecting his previous application.

5.—All elected candidates shall be duly notified and shall subscribe to the Constitution and Rules of the Society. Forms for these purposes shall be prescribed by the Board of Direction. If these provisions are not complied with within six months from the notification of election, such election shall be considered void, unless for special reason the time shall be extended by the Board of Direction.

Membership of any person shall date from the day of his election.

6.—Upon the written request of ten or more Corporate Members, that for cause therein set forth a person belonging to the Society be expelled, the Board of Direction shall consider the matter, and if there appears to be sufficient reason, shall advise the accused of the charges against him. He may, if he so desires, present a written defence which shall be considered at a meeting of the Board of Direction, of which he shall receive due notice. Not less than two months after such meeting, the Board of Direction shall finally consider the case, and if resignation has not been tendered, or a defence made which is satisfactory to the Board, it shall then notify the person that he will be expelled in one month, unless he elects to appeal from this decision. Appeals will be submitted to the Corporate Members by letter-ballot in a form to be prescribed by the Board of Direction. The ballot shall be accompanied by a statement of the charges, and of the action of the Board thereon, with such information as it deems proper, and also the statement of the person making the appeal. The ballot shall be canvassed by the Board not less than twenty days after its issue. A majority of the ballots cast will be required to sustain the action of the Board. The Board will notify the person and the Corporate Members of the result of the ballot. In case no appeal be made, the Board of Direction will expel the person, and notify him and the Corporate Members of its action.

7.—A member of any grade in the Society may resign his membership by a written communication to the Secretary, who shall present the same to the Board of Direction; when, if all his dues have been paid, his resignation shall be accepted.

8.—All persons elected and duly qualified, whose address on the records of the Society is within fifty miles of the Post Office in the City of New York, shall be deemed Resident; and those whose address is beyond that limit shall be deemed Non-Resident.

The classification of each person for the fiscal year as Resident or Non-Resident, shall be determined by the Records of the Society as they may appear on January 1st of that year.

The Secretary presented a brief outline of the inception and history of the proposed co-operation of the Society with other National Societies and the Engineers' Club of New York in the erection of an Engineering Building; and also read the resolutions framed by the Board of Direction for presentation to the Society at the Convention.*

G. W. Catt, M. Am. Soc. C. E., moved the adoption of the resolutions. The motion was seconded. The subject was then discussed.

At 5.50 P. M., adjourned to Wednesday, June 10th, 1903, at 9 A. M.

BUSINESS MEETING—(*Continued.*)

The meeting was called to order at 9.45 A. M., President Alfred Noble in the chair; Chas. Warren Hunt, Secretary.

The discussion on a proposed Joint Engineering Building was resumed.

The following motion, offered by H. S. Haines, M. Am. Soc. C. E., was seconded by Charles Hansel, M. Am. Soc. C. E.

"It is the sense of this meeting that the letter-ballot called for in the resolutions should be presented to the Society with the usual sixty days' notice and opportunity for discussion in business meeting."

After discussion, George S. Davison, M. Am. Soc. C. E., moved in amendment that the words "at the next Annual Meeting" be substituted for the words "in business meeting."

This amendment, being duly seconded, was carried.

B. M. Harrod, Past-President, Am. Soc. C. E., moved that the resolutions offered by the Board of Direction be amended as follows: Add to the third resolution the following:

"And also to make such investigations and hold such conferences as may bear upon the advisability of the acceptance of Mr. Carnegie's proposition by this Society."

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* See page 226.

Also insert, in the fifth resolution, after the words "can be obtained," the following words, "and that the acceptance of the proposition is otherwise practicable."

The motion, being duly seconded, was carried.

The resolutions as amended and adopted are as follows:

"*Whereas*, The resolutions submitted by the Joint Conference Committee in the matter of the Proposed Union Engineering Building are not in suitable form, in the opinion of the Board of Direction of the American Society of Civil Engineers, to be submitted to the Society:

"*Resolved*, That it is the sense of this Board that the proposition, when submitted to the Society, should make definite provision for the accommodations necessary for the present and future needs of the several organizations, and that the proportion of the total expense to be borne by each of the organizations concerned should be definitely stated, and be it further

"*Resolved*, That the Board of Direction recommends, to the Business Meeting to be held at the Annual Convention, the adoption of the following resolutions:

"*Resolved*, That the Board of Direction be authorized to ascertain whether suitable accommodations can be obtained for the Society in the proposed new building, with provisions for future needs, and also to make such investigations and hold such conferences as may bear upon the advisability of the acceptance of Mr. Carnegie's proposition by this Society.

"*Resolved*, That the Board of Direction be authorized to co-operate to this end with the other organizations concerned.

"*Resolved*, That the Board of Direction be requested, provided it is satisfied that suitable accommodations can be obtained, and that the acceptance of the proposition is otherwise practicable, to send to the members of the Society a letter-ballot by means of which a direct expression of the wishes of the Society in the matter may be secured, and to accompany such ballot by a statement of reasons for and against uniting in the scheme with the other organizations.

"*Resolved*, That the Board of Direction, in case a majority of the members, as shown by letter-ballot, are in favor of uniting with the other organizations, is authorized to proceed in behalf of the Society in carrying out the project."

The following resolution was then offered by Mr. Hansel:

"*Resolved*, That the American Society of Civil Engineers acknowledge the offer from Mr. Carnegie, and thank him sincerely for the opportunity, and advise him at the same time of the action to-day, and that the object of this delay is to determine and consider every feature of the situation carefully before deciding the matter."

The motion, being duly seconded, was carried.

After certain announcements relative to the programme had been made, the Business Meeting adjourned.

Second Session, Tuesday, June 9th, 1903, 8 P. M.—The meeting was called to order at 8 P. M., President Alfred Noble in the Chair; Chas. Warren Hunt, Secretary.

The President delivered the Annual Address.

Third Session, Wednesday, June 10th, 1903.—At the close of the Business Meeting the discussion of Engineering Topics was taken up.

Discussion on the first topic, "Timber Tests," was opened by W. K. HATT, Assoc. M. Am. Soc. C. E., on behalf of the United States Bureau of Forestry. Written discussions by Messrs. Gaetano Lanza and H. von Schrenk were not read, owing to the lateness of the hour. The topic was further discussed by the following:

A. L. JOHNSON, M. Am. Soc. C. E.
S. BENT RUSSELL, M. Am. Soc. C. E.

The meeting then took up the discussion of the second topic, as follows:

"Sewage Purification."

The subject was opened by a written discussion from RUDOLPH HERING, M. Am. Soc. C. E., presented by the Secretary.

Adjourned.

Fourth Session, Thursday, June 11th, 1903.—The meeting was called to order at 9.20 A. M., President Alfred Noble in the chair; Chas. Warren Hunt, Secretary.

The President introduced the Hon. Charles B. Aycock, Governor of North Carolina, who spoke as follows:

Ladies and Gentlemen: The suggestion of your President, that I address you this morning, takes me by surprise. I am not going to do that. I wish it had been my good fortune or that I had fitting occasion to have had the opportunity of expressing to you, in behalf of North Carolina, our appreciation of your coming among us. The good fortune of doing that rested with my good friend, General Davidson. What he has once done no man can do better, and I will not attempt, again, to put into fitting phrase the cordial welcome which all North Carolina extends to you. We are glad to have you with us. We take it as an honor that this learned Society should meet in our midst, and we know that we will find profit in your deliberations.

Now, I do not know anything about the work which you all do. There are some things, however, which it has been my observation that you have not yet accomplished, and to which I hope you will give your attention. In all your studies I hope that you will have in view that great body among whom I am a small particle, the consumers, and that you will be able in the future to unravel the mystery which controls the gas, water and electric meters, and I commend, Mr. President, to your most careful consideration, the study of the operation of a water meter which continues running long after the water has been shut off. I believe the old song tells us that the wheel is not driven by the water that has passed, but that is the water that we see on the outside; it continues to run on the inside (laughter). And when you have accomplished that purpose, why, we shall owe you a debt of gratitude that we can never repay.

But your deliberations are of value. They are of value to all the world. You have been of great service to this country as have the representatives of your great association in our State. There is no man whom we esteem more than your representative, Mr. Ludlow, who has been instrumental in bringing you here, and he, I am sure, has added to your comfort and pleasure. Again, I wish to express to you my appreciation of your coming among us, to express the hope that you will stay a long time, and to assure you that the longer you stay, the better we shall like you.

The Governor of this State is clothed with ample power to pardon you for any offense that you may want to commit. (Laughter and applause.) It has not been the custom of North Carolina governors to issue pardons in advance, but, looking into your faces, I promise you now to pardon you for any offense which any one of you may commit while within our borders; with one single exception, however, and that is, if you should leave us without regarding Asheville as the finest place in the universe, without regarding North Carolina as the best State in the Union, without wanting to come back and stay with us and be with us again - for that I cannot pardon you; (applause) for this is a beautiful section, and when you have seen Asheville, any Ashevillian will tell you that you have seen North Carolina, but North Carolina extends one hundred miles to the west of here and five hundred miles to the east. If you were to swing this good State of ours on Murphy as a pivot—Murphy lies one hundred and twenty miles west of here—Chocowinity, on our eastern coast, would rest on the spot that Chicago now tries to fill. (Laughter and applause.)

This is a State that we are very proud of, and we want you to know more about it. We are proud of her history, and would you regard it as offensive in me if I reminded you just for a moment of some of the history of which we are proud?

This State of ours was the first colony that was settled. The colonization was not a success, but we were colonized at first under the auspices of that great and good man, Sir Walter Raleigh, and we have named the capital of our State for him, not for his great achievements, understand, not for his wonderful learning, not for his statesmanship, not for his seamanship, but we have named the capital of this State in his honor for one simple little act, for we read in history that that great man, when he saw his queen about to wet her feet, dropped the rich cloak from his shoulders in order that she might walk dryshod across; (applause) and it is in memory of that deed, in the love of the woman, that we have named our capital after him.

It was this good State of ours that had the first Tea Party that was held in the Colonies. The Tea Party at Boston has been celebrated in song, in history, in romance, but the North Carolina Tea Party at Edenton, when the North Carolina Colonial Dames resolved that they would drink no more tea as long as the hated tax remained on it, is known to few outside of the borders of this State. And we had another Tea Party down on Cape Fear, three or four hundred miles from here, a Tea Party in which the men of old Cape Fear, in the broad open daylight, in the presence of the Royal Governor, took the stamp clerk and swore him that he would bring no more stamps into the Colony of North Carolina forever.

It was in this State of ours that the first victory was won in behalf of America—the battle of Moore's Creek, in Pender County. It was in this State of ours that the first Declaration of Independence was ever written; the Mecklenburg Declaration of Independence of the 20th of May, 1775. So that we are glad to welcome you to this historic place.

Along the lines of industrial activity, along the lines of commerce, along business lines, we have not kept pace with other States, but we have caught the step, and the future in this State shall furnish opportunities to men of your profession, and your profession will make us successful in many of the departments of life.

Again I greet you and thank you for the opportunity of looking into your faces and gathering further and renewed hope for North Carolina in the work which you do. (Applause.)

At the conclusion of the address, B. M. Harrod, Past-President, Am. Soc. C. E., opened the discussion of the third topic:

"In the Treatment of the Mississippi River, is the Levee Theory Justified by Experience?"

The Secretary read a communication on the subject from J. A. Ockerson, M. Am. Soc. C. E., and Samuel Tobias Wagner, M. Am. Soc. C. E., presented briefly the views of Lewis M. Haupt, M. Am. Soc. C. E.

Owing to lack of time the written discussion of L. W. Brown, M. Am. Soc. C. E., was not read.

The meeting then took up the discussion of the topic:

"Is it possible to make Concrete which will be Impervious to Water? If so, what is the best method?"

The subject was discussed by the following:

R. W. Lesley, Assoc. Am. Soc. C. E.
J. J. R. Croes, Past-President, Am. Soc. C. E.
J. W. Schaub, M. Am. Soc. C. E.
B. R. Green, M. Am. Soc. C. E.
O. Lowinson, Assoc. M. Am. Soc. C. E.
W. K. Hatt, Assoc. M. Am. Soc. C. E.

The Secretary read a communication on the subject from Mr. Edward Cunningham.

It was moved by J. W. Schaub, M. Am. Soc. C. E., that it is the sense of this meeting that a Special Committee be appointed to take up the question of concrete and steel-concrete, and that such committee co-operate with the Association for Testing Materials, and the Railway Engineers' Maintenance of Way Association, which also have a committee on this subject.

The motion, being duly seconded, was carried.

The next topic discussed was:

"In View of the Increasing weights of Rolling Stock, for what loadings should Railroad Bridges be designed?"

The discussion was opened by a communication from H.W. Hodge, M. Am. Soc. C. E., read by the Secretary; and was added to by the following:

J. W. Schaub, M. Am. Soc. C. E.
E. Swensson, M. Am. Soc. C. E.
T. L. Condron, M. Am. Soc. C. E.

It was moved by George W. Catt, M. Am. Soc. C. E., and seconded by B. R. Green, M. Am. Soc. C. E., that a committee be appointed to draft a series of resolutions of thanks to the several parties who have kindly entertained the Society at Asheville.

The motion was carried, and the President appointed Messrs. George W. Catt, H. S. Haines and B. R. Green.

Adjourned.

The following resolutions were prepared by the Committee and have been transmitted in accordance with the action of the Convention:

"*Whereas*, The Thirty-fifth Annual Convention of the American Society of Civil Engineers, at Asheville. N. C., June 9th–12th, 1903, will long be remembered by those who were fortunate enough to be present, as a most delightful social occasion.

"*Resolved*, That the thanks of the Society are hereby heartily tendered to the Local Committee of Arrangements, and particularly to its Chairman, J. L. Ludlow, M. Am. Soc. C. E., for the careful preparation, and successful carrying out, of the attractive programme."

"*Resolved*, That the thanks of the American Society of Civil Engineers are hereby cordially tendered to the Swannanoa Country Club, for courteously placing its interesting Golf Links at the disposal of the members and guests of the Society during the Thirty-fifth Annual Convention of the Society, June 9th–12th, 1903, and for hospitably throwing open its Club House to all who attended the Convention."

"*Resolved*, That the thanks of the American Society of Civil Engineers are hereby cordially tendered to the Asheville Club for courtesies extended to its members during the Thirty-fifth Annual Convention of the Society, June 9th–12th, 1903."

"*Resolved*, That the thanks of the American Society of Civil Engineers are hereby heartily tendered to W. F. Randolph, Esq., Secretary, Asheville Board of Trade, for his energetic efforts to add to the pleasure and comfort of all who attended the Convention, which were entirely successful, and very much appreciated."

"*Resolved*, That the thanks of the American Society of Civil Engineers are hereby tendered to the Asheville Electric Company for many courtesies extended to its members and guests on the occasion of its Thirty-fifth Annual Convention, June 9th–12th, 1903."

"*Resolved*, That the thanks of the American Society of Civil Engineers, and particularly of those who were so fortunate as to be present on the occasion referred to, are hereby tendered to Richard S. Howland, Esq., for the courtesy of his invitation to visit Overlook Park on Sunset Mountain, on June 11th, 1903, as well as for the hospitable 'Barbecue' which added so much to the pleasure and comfort of that occasion."

OF THE BOARD OF DIRECTION.

(Abstract.)

June 2d, 1903.—8.40 P. M.—President Noble in the Chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Briggs, Craven, Croes, Knap, Kuichling, Meade, Pegram, Schneider, Swain and Wilgus.

The thanks of the Board of Direction of the Society were voted to Charles Paine, Past-President, Am. Soc. C. E., for the presentation, in accordance with the request of the Board of Direction, of an oil painting of himself.

A report was received from the Committee appointed to attend the meetings of a Joint Conference Committee from other societies, and the Engineers' Club, presenting certain resolutions for the consideration of the Society.*

Resolutions for presentation to the Business Meeting of the Annual Convention were adopted.†

Applications were considered and other routine business transacted.

One candidate for admission as Associate, and five as Juniors were elected.‡

Adjourned.

June 9th, 1903.—The meeting of the Board, as required by the Constitution, was called at 9.30 P. M.

There were present Messrs. Noble, McDonald, Osborn, Pegram, Schneider and Hunt.

Inasmuch as a quorum of the Board at meetings convened at Annual Conventions is nine, no quorum being present, the meeting adjourned.

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* See page 224.
† See page 226.
‡ See page 198.

REPORT IN FULL OF THE FIRST SESSION OF THE THIRTY-FIFTH ANNUAL CONVENTION, INCLUDING THE BUSINESS MEETING, HELD AT THE BATTERY PARK HOTEL, ASHEVILLE, N. C.

Tuesday, June 9th, 1903.

The meeting was called to order at 2.30 P. M. by J. L. Ludlow, M. Am. Soc. C. E., Chairman of the Local Committee.

Address of Welcome, J. L. Ludlow.

J. L. Ludlow, M. Am. Soc. C. E.—Ladies and Gentlemen: As Chairman of the Local Committee of Arrangements, I have been allotted the privilege and pleasure of opening this, the Thirty-fifth Annual Convention of the American Society of Civil Engineers in the State of North Carolina. As a privilege, it is one that I appreciate highly; as a pleasure, it is one, the appreciation of which it is impossible for me to express. Not only words would fail me, but all the theorems, the formulas, the figures, ever thought of, conceived or used by the minds of those devoted to the art and science of engineering would not be able to express to you the pleasure that I feel in the honor which is thus conferred upon me. (Applause.)

Of North Carolina, the hospitality of which is as ancient as—well, say the Pyramids of Egypt—as unbounded as the atmosphere and the skies above us, as an adopted son, I would gladly address you, but of that it is not my privilege at this time to speak. I may, however, express one thought to prove my assertion of the limitless hospitality of North Carolina by reminding you, that when Fate decreed the most suitable birthplace for the first white child of America—the place that should be honored of all the American continent—Roanoke Island, in North Carolina, where even the Indians were found to be hospitable and kind, was the birthplace of Virginia Dare.

I have the honor of presenting to you one whose oratory and brilliant attainments are well known; a gentleman native and to the manner born, a typical North Carolinian who has been highly honored by his State, and returns a full measure of honor to her; one who exemplifies a lofty type of manhood in full harmony with the summits of Nature which surround us in this beautiful mountain region, that is so fittingly called the "Land of the Sky." He will speak to you a hearty welcome to the State of North Carolina and to the City of Asheville. I have the honor to present General Theodore F. Davidson. (Applause.)

Address of Welcome, Gen. Davidson.

Gen. Theodore F. Davidson.—Mr. President, Ladies and Gentlemen: Should any of you have come here expecting to hear an oratorical display from me, or should any of you have been encouraged in an expectation, not very well formed beforehand, by what my friend, Mr. Ludlow, has said, I am sure that you will meet with a very serious disappointment.

It has been Asheville's good fortune to receive and entertain, Mr. President, many distinguished men, associations and societies, representing almost every phase of the intellectual, the moral, the political, the scientific and industrial life and progress of this most marvelous age. I think I can say to you this afternoon truthfully, Mr. President, that no occasion has been more fruitful of pleasant anticipations, no event has excited greater interest, with a very large portion of this community, than the convention in Asheville of the American Society of Civil Engineers.

We recognize and appreciate the high privilege of having with us one of the most learned and famous scientific societies of the world; perhaps, I am told, and I have no doubt it is true, there is but one other organization, purely scientific, in the world, which compares with it in importance and in achievement; a society whose membership represents, not only the Western Hemisphere, but which has its representatives wherever Christendom prevails; whose influence encircles the whole globe, whose genius and achievements are visible in every land and upon every sea.

It is the peculiar fortune, Mr. President, of your profession—the exceptional distinction of the science of engineering in its broadest sense—that in every period, at every stage of the progress of mankind, from savage conditions to civilization, it has been the most potent factor and agent; and what is especially fortunate for you is that it has been able to perpetuate its history and its influence by the creations of its genius, so great and so enduring that they are universally recognized as the mile-stones of history. If the literature, the political policy, the social and intellectual organizations of the ancient civilizations are either entirely lost to us or so veiled by the dust of centuries as to be fabulous, the engineer of the time of the Pharaohs gave us the Pyramids, and it has come to pass here to-day that our debt to the Pyramids is very much greater than scientific, for they are admirable for the purpose of reference on occasions of this sort. (Applause.) The enduring evidence of skill in the science of construction, the splendid remains of the cities of Asia, of the wonderful irrigating systems of China—even of the semi-civilized Peruvians—the construction of artificial ports for the advancement and protection of commerce as at Ostia and Piræus, Alexandria, Carthage, and all along the shores and the islands of the Mediterranean—the wonderful examples of the science of fortification at Syracuse, ascribed, I believe, to Archimedes; the highways and aqueducts of immortal Rome; the unapproachable beauty and glory of St. Peter's dome and Florence's Campanile, are the enduring illustrations and records of your profession in the past.

It has been said, I believe, that so far had your predecessors pushed the development of your science at the close of the eighteenth century that the opportunities for its further advancement and exploitation had reached a conclusion, and there were no fresh fields to explore or opportunities for new applications of principles of

Address of Welcome (continued).

engineering. However that may have been, with the discovery of steam as a motive power, a new, a vast and as yet only partly occupied field for the employment and advancement of the science of engineering was displayed. How quickly that opportunity was seized, how generously and magnificently it has been utilized, how great have been the blessings you have been able to confer upon your age need no recital now; we have but to look around us to see them in every direction. We take no step, individually or collectively, but we feel their benign influences. Most truthfully has it been said that the mission and achievements of the engineer are the subjection and control of the forces of Nature to the uses and happiness of mankind.

The traveler who is carried safely and comfortably for miles under the Alps; who is transported with equal comfort and safety through the air across the yawning chasm of Niagara, or the turbulent tides of the Forth; the merchant who securely floats his valuable cargoes through the Suez Canal, or the Mississippi Jetties; or harbors them in the great docks of London, Liverpool, Antwerp, Bremen, Marseilles, or New York; the mariner who now confidently navigates every sea and finds on every dangerous shore ever-vigilant sentinels against danger, as well as the most careful provision for his comfort and safety—all are either the conscious or unconscious beneficiaries or the thankful beneficiaries of your professional skill.

It would be an impossible task for me, with unlimited time at my command, to portray as they should be portrayed your efficient labors in the various avenues of our modern domestic, social and industrial life. You pierce the clouds and the skies with the sky-scrapers devoted to commerce and domestic life. If you cannot fling your spans of bridges across the Hudson you can ignore that stream by tunneling beneath it and connecting states, empires and nations without trouble from the intervention of natural obstacles. In the way of hygiene, sanitation, municipal development and all the agencies which go to evolve and bring under subjection the natural resources, not only of this new continent, but of the old, you are the pioneers and will ever be the pioneers necessarily, because it is the necessary incident to the practice of your profession.

Your past, at least, is secure. Your future I believe to be more brilliant, to be fuller of the possibilities of greater scientific development and usefulness to the world. On this continent, not to mention other things, you are now to assume the gigantic work of the construction of an isthmian canal, with all its vast and incomprehensible consequences, to commerce, to policies and to peoples; you are called upon as Americans representing the American Society of Civil Engineers to take up the great work of reclaiming a vast area of our country, an arid area, from the desert of desolation, and make it the valley of untold productivity. The possibilities of the uses of electricity lie just before you, without it being in the ken of man to say what shall be the limits of those possibilities. The world waits upon you; you will ever be in the forefront, we are confident, in the future as in the past, of every movement for the advancement of knowledge, the progress of civilization and the happiness of mankind.

You will understand, therefore, Mr. President, and Ladies and Gentlemen, why we, the citizens of North Carolina, and especially of this little city in the mountains, welcome your coming with unusual interest, and I can only say in behalf of those people, and express the hope that the pleasure and profit we derive from your coming together here now will, in some degree, approach the feeling of thankfulness that the citizens of Asheville and of the State of North Carolina, I may add, entertain for the very great honor that you have done them in your coming together here, and, to quote the language that old Colonel Buncombe, for whom this County was named, inscribed upon his mansion in eastern North Carolina in the colonial days, "To Buncombe Hall, Welcome All." (Applause.)

Alfred Noble, President, Am. Soc. C. E.—General Davidson, I accept, on behalf of the American Society of Civil Engineers, the most gracious welcome which you have accorded us. Our anticipations have been raised very high by the eloquence of our member, Mr. Ludlow, as he sought in glowing words to depict the attractions of this city in the mountains. For your hearty welcome we can only return our most fervent thanks. We appreciate very gratefully the kind words that you have been pleased to express in regard to our chosen profession, and if we may not reach the high ideals which you have placed for us, we must never forget that we must strive to come as near them as possible. With the sincerest thanks, General Davidson, we receive your welcome in a spirit no less cordial than that in which you have expressed it. (Applause.)

BUSINESS MEETING.

President Noble in the chair; Charles Warren Hunt, Secretary.

The President.—The Society will now come to order for its regular business meeting. The first question before the Society is the time and place for holding the next Annual Convention.

Convention of 1904.

The Secretary.—It having been practically understood at previous business meetings that the Convention of 1904 should be held in St. Louis during the Louisiana Purchase Exposition, the customary ballot was not sent out this year to members asking their preferences as to where the Convention should be held. It has been customary in the past that a discussion of the time and place for holding the next Annual Convention should take place each year at the Annual Convention. The usual course has been to express the views of the business meeting, and then to refer the matter with power to the Board of Direction.

I have, in that connection, Mr. President, received some letters in regard to St. Louis.

The President.—The Secretary will read them, if there is no objection.

Letter from D. R. Francis.

The Secretary.—I will read a letter addressed to the President of the Society, dated May 15th, by Mr. D. R. Francis, President:

"St. Louis, U. S. A., May 15, 1903.

"*To the President of the*
American Society of Civil Engineers,

"Sir:—

"On behalf of the Louisiana Purchase Exposition I desire to extend to the American Society of Civil Engineers a cordial invitation to hold the annual meeting of the Society for 1904, in the City of Saint Louis.

"In that year will be held at Saint Louis the Universal Exposition in commemoration of the one hundredth anniversary of the Purchase of Louisiana Territory. The Exposition management will be prepared to furnish without charge a satisfactory hall, for the holding of the sessions of the Society. The Committee on Ceremonies will, if desired, recognize the presence of the American Society of Civil Engineers by setting apart a special day, or by providing some distinctive feature of the program.

"The Information Service, conducted without charge by the Exposition management, will assist delegates in obtaining satisfactory accommodations at reasonable prices. The fair name of Saint Louis for hospitality will not be marred in 1904. Assurances given by the railroads warrant the promise of very low rates of transportation.

"Respectfully,

"D. R. Francis,
"*President.*"

Letter from C. P. Walbridge.

Also a letter dated May 18th, from the Business Men's League, C. P. Walbridge, President:

"St. Louis, May 18, 1903.

"*To the President of*
The American Society of Civil Engineers,
In Session at Asheville, N. C.

"Sir:—

"The Business Men's League of St. Louis has the honor to extend an invitation to the American Society of Civil Engineers to hold its Convention in 1904 in St. Louis. The great Louisiana Purchase Exposition will then be open, and the city will be most attractive. The hotel and hall accommodations will be adequate, and railway rates will be low.

"Very truly yours,

"C. P. Walbridge,
"*President.*"

"Wm. Flewellyn Saunders,
"*Secretary and General Manager.*"

Letter from Rolla Wells.

Also a letter from the Mayor of St. Louis:

"St. Louis, May 20, 1903.

"*To the Honorable President and Members of*
The American Society of Civil Engineers,
Asheville, N. C.

"Gentlemen:—

"In behalf of the City of St. Louis, I take pleasure in extending to your Society a cordial invitation to hold your annual meeting for the year 1904, in this city.

"Very truly,

"Rolla Wells,
"*Mayor.*"

Letter from J. A. Ockerson.

Also a letter dated May 22d, addressed to the President, by the local members of the American Society of Civil Engineers, and by J. A. Ockerson, a member of this Society:

"St. Louis, Mo., May 22, 1903.

"Mr. Alfred Noble,
President, American Society of Civil Engineers.

"Dear Sir:—

"At a recent meeting of the local members of the American Society of Civil Engineers, also at a meeting of the St. Louis Engineers' Club, I was requested to extend, in their behalf, a most cordial invitation to the American Society of Civil Engineers to hold its Annual Convention of 1904 in this city, and I now take great pleasure in doing so.

"In addition to these invitations, I enclose herewith invitations from the Business Men's League, the Mayor of the City, and the President of the Louisiana Purchase Exposition.

"It is something more than twenty-three years since the Society met in this city, and it is believed that the celebration of the anniversary of the Louisiana Purchase, by a Universal Exposition next year, will make this city particularly attractive as a meeting place. It is hoped, therefore, that these invitations will be presented to the Society at the next Annual Convention and receive favorable consideration.

"Yours very respectfully,
"J. A. Ockerson,
"*M. Am. Soc. C. E.*"

The President.—The subject is now before the Convention.

Henry B. Seaman, M. Am. Soc. C. E.—Mr. President, the discussion of the subject hardly seems necessary, as the Secretary says it has been previously under discussion, and I move that the matter be referred to the Board of Direction, with power to act.

The motion was seconded and carried.

The President.—The next subject before the Convention is the proposed Amendment to the Constitution, which the Secretary will read.

The Secretary presented the amendment, as follows:

Amendment to the Constitution.

Amend the Constitution by striking out Sections 6, 7 and 8 of Article II, and the whole of Article III, and substituting therefor the following:

ARTICLE II.—Membership.

* * * * * * * *

6.—A Junior shall not be less than eighteen years of age, and his connection with the Society shall cease when he becomes thirty years of age, unless he be previously transferred to another grade. He shall have had active practice in some branch of engineering for at least two years, or he shall have graduated from a school of engineering of recognized standing. Persons who are in the Junior class at the time of the adoption of this Constitu-

Amendment to the Constitution (continued).

tion shall not have their status changed by the provisions of this section.

7.—Honorary Members shall be chosen only from persons of acknowledged eminence in some branch of engineering or the sciences related thereto. There shall not be more than twenty at any one time.

8.—Fellows shall be contributors to the permanent funds of the Society, though they may not be eligible for admission as Corporate Members.

ARTICLE III.—Admissions and Expulsions.

1.—Honorary Members shall be proposed by at least ten members, and shall be elected only by a unanimous vote of the Board of Direction. A Past-President, or a member of the Board of Direction proposed for Honorary Membership, shall not be required to vote either for or against his own admission.

A person elected an Honorary Member shall be promptly notified thereof by letter. The election shall be cancelled if an acceptance is not received within six months after the mailing of such notice.

2.—An application for admission to the Society or for transfer from one grade to another shall embody a concise statement, with dates, of the candidate's professional training and experience; and shall be in a form and in such detail as may be prescribed by the Board of Direction. It shall be signed by the applicant, and shall contain a promise to conform to the requirements of membership, if elected. The applicant shall furnish the names of at least five Corporate Members to whom he is personally known. Each of these shall be requested by the Secretary to address a letter to the Board of Direction, on a form prescribed by said Board, stating the extent of the writer's personal knowledge of the applicant and of his professional work. If at least five of the Corporate Members named as references do not furnish the requisite endorsement, the Secretary shall call upon the applicant for additional names, and not until written communications shall have been received from at least five Corporate Members shall the application be considered by the Board.

Applications of engineers not resident in North America, and who may be so situated as not to be personally known to five Corporate Members, may be recommended for ballot by five members of the Board of Direction, after having secured evidence sufficient, in their opinion, to show that the applicant is worthy of admission.

3.—At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all new applications received for admission or for transfer, which list shall be dated and shall contain a concise statement of the record of each applicant and the names of his references, with a request that members transmit to the Board any information in their possession which may affect the disposition of the applications. Not less than twenty days after the issue of such list, the Board of Direction shall consider these applications, together with any information in regard to the applicants that may have been received; may make further inquiries, if deemed expedient; shall classify the applicant with his consent, and on applications for admission may direct a ballot.

The Board shall have the power to transfer persons from a lower to a higher grade of membership, and shall notify the membership of its action.

4.—The ballots shall be letter-ballots, in a form to be prescribed by the Board of Direction. They shall be mailed to each Corporate Member whose address is known, and shall state the date on which the ballot is to be canvassed, which shall be not less than twenty days after the issue of the ballot. Twenty or more negative votes shall exclude from election. In case of exclusion, no notice thereof shall be entered on the minutes, but the candidate shall be notified.

5.—All elected candidates shall be duly notified and shall subscribe to the Constitution and Rules of the Society. Forms for these purposes shall be prescribed by the Board of Direction. If these provisions are not complied with within six months from the notification of election, such election shall be considered void, unless for special reason the time shall be extended by the Board of Direction.

Membership of any person shall date from the day of his election.

6.—Upon the written request of ten or more Corporate Members, that for cause therein set forth a person belonging to the Society be expelled, the Board of Direction shall consider the matter, and if there appears to be sufficient reason, shall advise the accused of the charges against him. He may, if he so desires, present a written defence which shall be considered at a meeting of the Board of Direction, of which he shall receive due notice. Not less than two months after such meeting, the Board of Direction shall finally consider the case, and if resignation has not been tendered, or a defence made which is satisfactory to the Board, it shall then notify the person that he will be expelled in one month, unless he elects to appeal from this decision. Appeals will be submitted to the Corporate Members by letter-ballot in a form to be prescribed by the Board of Direction. The ballot shall be accompanied by a statement of the charges, and of the action of the Board thereon, with such information as it deems proper, and also the statement of the person making the appeal. The ballot shall be canvassed by the Board not less than twenty days after its issue A majority of the ballots cast will be required to sustain the action of the Board. The Board will notify the person and the Corporate Members of the result of the ballot. In case no appeal be made, the Board of Direction will expel the person, and notify him and the Corporate Members of its action.

7.—A member of any grade in the Society may resign his membership by a written communication to the Secretary, who shall present the same to the Board of Direction; when, if all his dues have been paid, his resignation shall be accepted.

8.—All persons elected and duly qualified, whose address on the records of the Society is within fifty miles of the Post Office in the City of New York, shall be deemed Resident; and those whose address is beyond that limit shall be deemed Non-Resident.

The classification of each person for the fiscal year as Resident or Non-Resident, shall be determined by the Records of the Society as they may appear on January 1st of that year.

Amendment to the Constitution (continued).

The above amendment is proposed by the following Corporate Members:

John F. Wallace,
David Sloan,
Ralph Modjeski,
J. W. Schaub,
Albert F. Reichmann,
C. A. Hasbrouck,
Frank J. Llewellyn,
Charles L. Strobel,
Geo. F. Swain,
William Jackson,
John E. Cheney,
S. Everett Tinkham,
Geo. S. Davison,
Emil Swensson,
J. A. Atwood,
W. C. Hawley,
W. G. Wilkins,
Josiah A. Briggs,
J. J R. Croes,
A. Noble,
H. S. Haines,
Jos. O. Osgood,
Geo. H. Pegram,
Edw. P. North.

The President.—Would it not be as well to give a concise statement as to the effect of this amendment?

Discussion on Amendment to the Constitution.

The Secretary.—The first three sections of Article II are identical with the present Constitution, with the exception that the original Constitution states that in applications for admission of Juniors the applicant shall state that he intends to become or continue to be an engineer. The reason for taking that out is that this present amendment contemplates that no applicant, whether for Junior or for Member, shall make an application for any definite grade, and in the old Constitution it would require him to specify in the body of his application that he applies for junior membership. It is merely to make the matter conform with the remainder of the article.

Section 1 of Article III, relating to Honorary Members, is identical with the present Constitution; there is no change made.

Section 2 of Article III, relating to applications, is changed so that all applications received are applications for admission to the Society, not for admission as Member, Associate Member, Associate, Junior, or Fellow; and the whole intent of this section is to print in the preliminary list—what we call the blue list—the preliminary notice of candidacy, in an alphabetical list, all applications for membership exactly as is now done, with the names of references given, except that they shall not specify that some of them are for Member, some for Associate Member, some for Associate, some for Junior, and so on.

After exactly the same process as is now in vogue is gone through with by the Board of Direction, the Board classifies the applicant, and, having secured his consent to that classification, issues his name on a ballot list, exactly as at present, to all the members.

A Member.—That includes Juniors too, does it?

The Secretary.—Yes, that is as it stands at the present time. The next clause gives the Board the power to transfer persons from a lower to a higher grade without a further vote of the membership of the Society, and simply states that they shall notify the Society of that action. Under the present system, if a member is elected a Junior, he must again be elected an Associate Member, because he cannot transfer from Junior to full membership, and it is quite possible (and it has been done) that a man is elected to the Society by the membership three times.

The next clause is identical with the present clause of the Constitution in regard to letter-ballots, with the exception that, instead of seven negative votes excluding, the provision of this amendment is that there shall be twenty votes necessary for the exclusion of a candidate. Those are the only changes, Mr. President, except that in this amendment the present reconsideration ballot is entirely done away with. Under the present system the ballot on a candidate excluded by seven negative votes can be reconsidered upon the request of eight Corporate Members, and, having gone through the regular form, he can be elected, providing 10% of all the ballots cast, which are signed ballots, are not against him. In other words, while it is possible for a candidate, under the present Constitution, to be defeated with fifteen votes against him, it is also possible, and I may say that I believe it has been done, that a candidate has been elected with forty odd votes against him on the pink ballot. It simply depends on the number of ballots that come in. It is the percentage of the ballots cast. In this amendment the pink ballot is done away with entirely.

G. W. Tillson, M. Am. Soc. C. E.—How soon can one come up for admission again if rejected?

The Secretary.—There is no specification, sir, in this amendment as offered.

The President.—The amendment is now before the Society for amendment.

J. J. R. Croes, Past-President, Am. Soc. C. E.—Mr. President, the first clause of Article III is rather indefinite. It provides for the admission of an Honorary Member, but there is nothing in the section thereafter which states precisely the manner in which a candidate for membership shall be admitted to the Society. I would move that there be added a third clause to Section 1 of Article III to read as follows:

> "All members other than Honorary Members and Juniors shall be admitted to the Society only by vote of the Corporate Members as hereinafter specified."

That covers the method of admission to the Society which is not contained in any other part of the Constitution.

A Member.—How about Associates?

Mr. Croes.—Associates are elected by a vote of the Corporate Members. As stated in the rest of the Constitution, all applicants make application simply for membership. The Board classifies them. The Society elects them. If they are classified as Members, as Associate Members, or as Associates, the ballot goes out for the person in that

Discussion on Amendment (continued).

grade, and, in the present form of the amendment, it provides for the election of Juniors in the same way. I wish to move an amendment also to the second paragraph of Section 3 of Article III.

The President.—Would it not be best to take action on the proposed amendment first?

Mr. Croes.—Well, yes; the first amendment I offer is this one, defining simply the manner in which members are admitted to the Society.

George H. Pegram, M. Am. Soc. C. E.—I second the motion, Mr. President.

A Member.—How are Fellows to be elected?

The President.—Will Mr. Croes answer the question?

The Secretary.—Under this amendment, sir, by general vote, even if Mr. Croes' amendment passes.

Mr. Croes.—Fellows shall be contributors to the permanent funds of the Society though they may not be eligible for admission as Corporate Members.

A Member.—And they are elected by ballot?

The Secretary.—Under this amendment; yes, sir.

Mr. Seaman.—Mr. President, by this proposed amendment, a Junior does not come up for general ballot. He is elected by the Board. The Board can then, in a year or so, transfer him to full membership.

Mr. Croes.—If the gentleman will pardon me, there is an amendment referring to that which the President directed should not be read at this time. I would state, though, that the amendment which I propose to offer in connection with that subject, after this amendment has been acted upon, is that the Board shall have power to elect persons to the grade of Junior and to transfer persons from any grade except that of Junior to a higher grade of membership. Those two go together, but they are separate amendments. If you adopt the first one you want to adopt the second one, too.

B. R. Green, M. Am. Soc. C. E.—How are Associates elected now?

Mr. Croes.—By the Board.

Mr. Green.—According to this proposed amendment, they are elected by the Society.

Mr. Croes.—By the Society, yes.

Mr. Green.—Is that desirable?

Mr. Croes.—Yes. The question has been asked how Fellows are elected now?

The Secretary.—They are elected by the Board, sir, just the same as Juniors and Associates.

Mr. Green.—This makes them elected by the Members ?

The Secretary.—It makes every man elected to a permanent grade in the Society elected by the membership at large. It allows the Board to elect a Junior, whose term as a Junior ceases when he becomes thirty years of age, and, consequently, as it is not a permanent grade, Mr. Croes proposes to have him elected by the Society again into one of the permanent grades.

The President.—Are you ready for the question? If there is no further discussion, the chair will put the question.

The question was put and carried.

Mr. Croes.—Now, Mr. President, I offer the amendment to the second paragraph of Section 3, Article III. It now reads:

> "The Board shall have the power to transfer persons from a lower to a higher grade of membership, and shall notify the membership of its action."

The amendment is, that the Board shall have the power to elect persons to the grade of Junior and to transfer persons from any grade except that of Junior to a higher grade of membership, and shall notify the membership of its action. It does not seem to me to be advisable to have the Juniors elected by the Society, but to have the Juniors elected by the Board, and when they want to go higher, their election by the Society takes place. That covers the question which Mr. Seaman asked.

The amendment was seconded.

The President.—The amendment to the amendment is seconded. It is now before the Society for discussion. If there is no discussion, the Chair will put the question.

The question, being put, was carried.

The Secretary.—I have a communication which I would like to read. It is from Mr. James Burden, an Associate Member of the Society.

Letter from James Burden.

"Troy, New York, May 3, 1903.

"Mr. Charles Warren Hunt,
Secretary Am. Soc. of C. E.,
New York.

"Dear Sir:

"I am in receipt of the proposed amendment to the Constitution.

"In Article II, Section 6, it says of the Junior Member, that 'his connection with the Society shall cease when he becomes thirty years of age.' This is as the case now stands, and it has always seemed to me unfortunate. In nearly every class in an engineering school are some men who graduate so near this limit that they cannot avail themselves of the advantages of Junior membership, as they would not at thirty be eligible for Associate membership, yet these men are not infrequently those who have had to fight their own way, and are keenly in earnest in their professional work. It seems to me that the limit might well be thirty-five years. This would prevent no one from applying earlier for a higher grade.

"I have known application for Junior membership to be advised on the ground that at thirty a man would probably be admitted to

Discussion on Amendment (continued).

Associate membership who might be rejected if he were outside of the Society. If the limit were thirty-five he could be made to wait or would probably elect to do so himself.

"Very truly yours,
"James Burden,
"Assoc. M. Am. Soc. C. E."

At Mr. Burden's request, I offer for him the amendment to change the word "thirty" to "thirty-five."

The President.—Is the proposed amendment seconded?

The amendment was seconded.

The President.—It is now before the Society for discussion.

H. F. Wilson, Jr., Assoc. M. Am. Soc. C. E.—Mr. President, it seems to me that thirty-five makes a man wait rather late in life. What is the matter with thirty-two or thirty-three?

Mr. Seaman.—I think that is a good suggestion, Mr. President. I think thirty is the age which we should reach; but there is the objection suggested by Mr. Burden, and those on the Board are familiar with the fact that we often have to make special rulings, or rather the Board has often to make special rulings, to cover those special contingencies. I would move that the age of thirty be changed to the age of thirty-two.

The President.—The motion is that the age be changed from thirty to thirty-two.

The Secretary.—On behalf of Mr. Burden, acting for him as nearly as I can do in his absence, I will accept the amendment. I think it covers the ground that he intended to cover.

The President.—If there is no objection, the age of thirty-two will be accepted in lieu of the age of thirty-five. Is there any discussion on the proposition as it now stands?

Mr. Wilson.—It seems to me, Mr. President, that thirty-three would be better. The change is very little from thirty to thirty-two. It strikes me that if a man is going to get out of college at all he will get out at the age of thirty years, and he will then have two years in the Junior grade before he can go into the grade of Associate Member.

The Secretary.—If I am allowed one more word, I think the only objection to changing the time at which a Junior ceases to be a Junior of the Society is that, under the present Constitution the age at which he ceases to be a Junior is coincident with the age at which he becomes eligible for membership. Consequently, it is impossible for a Junior to transfer from the grade of Junior to the grade of Member under our present Constitution. That has elements of propriety, however, inasmuch as it then becomes necessary, if he wants to continue his connection with the Society, to go through the grade of Associate Member. I think, however, that this matter would be entirely in the hands of the Board of Direction. We would simply get more applications from people who wanted to transfer from the grade of Junior to the grade of Member, because they would become eligible, because a man is eligible when he is thirty for the highest grade, but under this amendment perhaps the same thing would not obtain, because no man applies for any specific grade of membership. I merely make that as a suggestion.

THE PRESIDENT.—Any further discussion? The question is on the substitution, in Section 6, of Article II, of the words "thirty-two" for "thirty."

The motion, being put, was carried.

Letter from S. Whinery.

THE SECRETARY.—If there is no further discussion of this amendment, I have a communication from Mr. Samuel Whinery.

"NEW YORK, May 29, 1903.

"MR. CHAS. WARREN HUNT,
"*Secretary, Am. Soc. C. E.*,
"220 West 57th St., N. Y.

"DEAR SIR:—As I shall not be able to attend the Asheville Convention, at the business meeting of which the pending amendments to the Constitution of the Society are to be discussed, I ask, if it will be in order, to submit my views on these amendments in writing.

"If I correctly understand the proposed amendments, they will, if adopted, in their present form, change the present practice of the Society in the following particulars:

"1st.—Applications for admission would be simply for membership, and the Board of Directors would determine the class to which the applicant may be admitted. It is not clear, however, from the language of the amendment, that applications for advancement to a higher grade shall be simply for transfer, without reference to grade, since the first sentence of Section 2, Article III, seems to contemplate that applications may be made to the Board for transfer from one grade to another stated grade. The logical inference from the trend of the amendments is that beyond an application simply for transfer, the grade to which the applicant is to be transferred shall be determined by the Board. Indeed, if the general spirit of the proposed change is adhered to, the logical conclusion would be that the initiative in proposing transfers should be taken by the Board, and should not originate in a request by the applicant. There would obviously be serious objections to this principle in practice, since the Board would then be charged with following the professional career of each member in any class in order to propose deserved promotions. While the Board should undoubtedly have the right, after proper investigation, to classify applicants for either admission or transfer, there seems to me to be no sufficient reason why applications should not, as now, be made for admission or transfer to a definite grade.

"The only objection to the present practice that seems to have any weight is that it may be personally embarrassing to the applicant, after having applied for membership in any stated grade, to be consigned to a different and perhaps lower grade by the Board. I think the importance of this objection has been greatly exaggerated. If, however, any applicant is sensitive on that point, there is now nothing to prevent him from applying for admission or transfer to 'Any grade

Discussion on Amendment (continued).

the Board may elect,' instead of naming the grade to which he aspires. In favor of the present practice it may be said that while the Constitution attempts to define the qualifications necessary for admittance to each grade, the question whether an applicant meets these qualifications is an open one, which each corporate member has the right to decide for himself, and to vote accordingly, whatever may be the judgment of the Board. A member may have perfectly valid reasons for voting for the admission of an applicant to one grade and for voting against his admission to another. Furthermore, these reasons may be such that if the grade applied for is stated in the 'blue list' a member may write to the Board giving reasons why the applicant should not be admitted to that grade, while if the grade is not stated in the 'blue list' he may neglect to communicate with the Board under the impression that that body will classify the applicant in accordance with his (the member's), views, and if, when the ballot is issued, he finds that the applicant has been classed in a higher grade than seems proper, he may feel compelled to cast a negative ballot, not because of any objections to the applicant himself, but because he has been placed, by the Board, in a class to which, in the opinion of the voter, the applicant is not entitled. If rejected for such reasons alone, the applicant might have greater cause for dissatisfaction and embarrassment than if the grade he aspires to, after being published in the 'blue list' were changed by the Board before the ballot were sent out.

"2nd.—The number of ballots necessary to reject an applicant would be twenty or more instead of seven or more, as at present. I favor an increase of the number of negative ballots required to reject, and with the present number of corporate members, twenty is not unreasonable, though in my opinion that number is rather too high. Since, however, the membership is rapidly increasing, this number of adverse votes may, before very long, be relatively smaller than seven when the Constitution was adopted, or than it is even now. I think the number of negative ballots necessary to reject should bear some definite ratio to the number of corporate members. A satisfactory ratio once adopted, it would not then be necessary to again change the Constitution with the growth of the Society. If the ratio were fixed at three-quarters of one per cent. of the corporate membership, the number of negative votes required at the present time would be seventeen which seems to me to be about right.

"The proposed amendments are silent upon the question whether a rejected candidate may subsequently renew his application for membership. In view of the probable abolition of the present provisions for reconsideration I think provision for renewal of application should be made, particularly since if not defined in the Constitution, the question of the legality of such renewal of applications is quite sure to arise in the future.

"3rd.—The provision for reconsideration of the ballot upon rejected applications would be abolished. There seems to be wide dissatisfaction in the Society with the existing "Pink ballot" system and it is probably advisable to abandon it; though such abandonment may sometimes result in grave injustice to worthy members of the profession.

"4th.—After admission to any grade of membership the Board would have the power to transfer the persons so admitted to higher grades of membership without the formality of a ballot by the corporate members. In other words, a person admitted to Junior membership might be advanced successively to the grade of Honorary Member without giving the corporate membership an opportunity to vote upon the question.

"It may readily occur that the desirability of submitting an application for advancement to a ballot of the membership may be greater than upon the original application for admission. Corporate members who voted for the admission of an applicant as Junior may have good reasons to vote against the advancement of that Junior to full membership, and they should not be deprived of the right to do so. If a ballot upon admission is desirable or important at all, it must become more desirable and important in the case of proposed advancement to the grades of Associate Member and Member. I am opposed to this feature of the proposed amendment.

"5th.—Under the proposed amendment applications for admission to the grade of Junior would be treated precisely as are applications for admission to the higher grades, including the ballot by the corporate members.

"Inasmuch as the grade of Junior is a temporary one, membership in which expires by limitation at the age of thirty, I can see no necessity for the proposed change. It seems desirable, for the encouragement and help of the young members of the profession, to allow them to enter the Society in the grade of Junior with as little formality as possible. The question of professional standing or conduct generally does not exist or it is not important. If the applicant possesses the constitutional requirements for admission, and no evidence is presented derogatory to his personal character, there seems no good reason why the Board should not admit him without the formality of a membership ballot.

"For the reasons stated, I would, if present at the Convention, move that the proposed amendments be amended as follows:

"1st.—Strike out Section 3 of Article III and substitute therefor the following:

"3. At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all applications received for admission, or for transfer from one grade to another, which list shall be dated and shall contain a concise statement of the record of each applicant and the names of his references, with a request that members transmit to the Board any information in their possession which may affect the disposition of the applications. Not less than twenty days after the issue of such list, the Board of Direction shall consider these applications, together with any information in regard to the applicants that may have been received; may make further inquiries if deemed expedient; and may, for reasons deemed sufficient, reject the application. If not rejected, the Board shall determine the grade of membership to which the applicant is entitled, and, with his consent, may, except in the case of applications for Junior, direct a ballot.

"2nd.—Strike out the last paragraph of Section 3, Article III, reading as follows: 'The Board shall have power to transfer persons from a lower to a higher grade of membership, and shall notify the membership of its action.'

"3rd.—In Section 4, Article III, strike out the sentence, 'Twenty or more negative votes shall exclude from election,' and substitute therefor the sentence, 'If upon such ballot the number of negative votes, in the case of an applicant, shall exceed three-fourths of one per cent., excluding fractions, of the total number of corporate members of the

Discussion on Amendment (continued).

Society, as shown by the Secretary's report at the last preceding Annual Meeting, such applicant shall fail of election.'

"4th.—Add to the end of Section 4, Article III, the following: 'The Board of Direction, after making such inquiries as it may deem necessary, shall have the power to elect applicants to the grade of Junior; and shall notify the membership of such election.'

"'A rejected applicant may renew his application for membership at any time after the expiration of one year from the date of the ballot rejecting his previous application.'

"If the amendment, so amended, were adopted, the resulting changes in the present practice of the Society would be as follows:

"Applicants for admission to the Society would be classified by the Board; applications for admission to all grades except that of Junior, and for transfer from one grade to another would be submitted to ballot by the membership; the number of negative ballots necessary to reject an applicant would be largely increased and fixed at a definite ratio to the corporate membership; rejected applications might be renewed after one year, and the 'Pink ballot' system would be abolished.

"Yours very truly,

"S. Whinery."

It seems to me that the suggestion of Mr. Whinery, that a rejected applicant may renew his application for membership at any time after the expiration of one year from the date of the ballot rejecting his previous application is a very wise one, and it is practically what is done now.

Mr. Seaman.—I will second that portion, providing that it may be renewed at the end of one year.

The Secretary.—It may be placed at the end of Section 4 of Article III:

"A rejected applicant may renew his application for membership at any time after the expiration of one year from the date of the ballot rejecting his previous application."

The President.—Is there any amendment to the amendment as read? It has been seconded and it is before the Convention. Is there any discussion?

G. S. Davison, M. Am. Soc. C. E.—Mr. President, I should think that the absence of that condition in the Constitution would be just the same as the addition to it. I should think that after a man is rejected, there is no record made of it, and he is privileged to come before the Society at any time. The only difference would be that he might come before the year is out. It is not very likely that the Board of Direction, having had charge of a man's candidacy once, would take it up again within the same year.

The Secretary.—I think I might answer that objection by saying that all applications which come in must go out on the blue list before they come to the Board of Direction at all, so that in case it were not definitely fixed that a certain time should elapse after the original ballot, a man might send in an application once every three months, and if the usual routine were carried out, his name would go out on a blue list each time as a candidate before it would come to the attention of the Board.

Mr. Davison.—I can see the force of the argument, and I think the suggestion is a very good one.

The President.—Is there any further discussion?

Rudolph P. Miller, Assoc. M. Am. Soc. C. E.—Mr. President, according to this proposed amendment, it seems that the Board does not have to notify the membership of the request for a transfer from a lower to a higher grade. It seems to me that the members ought to have some right to speak on such a matter. There is as much reason why a member should be privileged to express his reasons why a man should not be transferred in the case of a transfer as in the case of an application for membership.

The Secretary.—May I make another explanation? Section 3 of Article III provides that:

> "At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all new applications received for membership in any grade or for transfer from one grade to another."

B. M. Harrod, Past-President, Am. Soc. C. E.—Does the amendment by Mr. Whinery determine the question whether a transfer shall be made by application or by immediate action of the Board? I think that point ought to be settled.

The President.—The Chair would suggest that it might be well to pass upon the question of the renewal of an application before taking up another subject. Is there any discussion on the motion providing for the period of one year elapsing on the rejection of an application before it can be renewed?

There being no further discussion, the question was put and carried.

Mr. Harrod.—I think it ought to be settled whether a transfer is to be made by application from the member or by the immediate action of the Board of Direction.

The Secretary.—Section 2 of Article III, as amended, provides that:

> "An application for admission to the Society or for transfer from one grade to another shall embody a concise statement, with dates, of the candidate's professional training and experience; and shall be in a form and in such detail as may be prescribed by the Board of Direction. It shall be signed by the applicant, and shall contain a promise to conform to the requirements of membership, if elected."

Mr. Harrod.—Do you think that is a sufficient notice to members; that if they desire a transfer, they may make application themselves?

The Secretary.—Yes, that seems to cover the point.

The President.—Does any member desire to offer any further amendments to the amendment? If not, the Chair will declare the dis-

Discussion on Amendment (continued).

cussion on the proposed amendment closed, and it will go out to the membership on the letter-ballot in the usual way.

Project for Joint Engineering Building.

The next topic before the Convention is the proposed co-operation of the Society with other National Societies and the Engineers' Club of New York in the erection of an Engineering Building. The Secretary will read a statement covering the history of the proposition up to this time.

The Secretary.—A brief outline of the inception and history of the project to date is as follows: After a preliminary meeting with Mr. Andrew Carnegie, Mr. Charles F. Scott and Mr. Calvin W. Rice, of the Electrical Engineers, called a meeting of some members of each of the Societies, and of the Engineers' Club, on February 11th, 1903. This meeting resulted in the appointment of a Committee consisting of Messrs. Scott and Rice of the Electrical Society, Messrs. Redding, Kafer and Thomson of the Engineers' Club, the latter also a member of this Society, and Mr. John Fritz, and this Committee had a conference with Mr. Carnegie on February 14th, 1903. At this time the Engineers' Realty Company had secured a 50-ft. lot on West Fortieth Street. At this conference Mr. Carnegie wrote the following letter:

Letter from A. Carnegie, Esq.

"2 East 91st Street,
"New York, February 14th, 1903.

"Gentlemen of the American Society of Civil Engineers, American Society of Mechanical Engineers, American Institute of Mining Engineers, American Institute of Electrical Engineers, and the Engineers' Club:

"It will give me great pleasure to give, say, one million dollars to erect a Suitable Union Building for you all, as the same may be needed.

"With best wishes,
"Truly yours,
"Andrew Carnegie."

After several subsequent meetings of those who were identified with the project, the various societies appointed each a committee of three to formulate a scheme for presentation to the societies for action. (The Committee of this Society could not be legally appointed prior to the first conference meeting, and the President was requested by an informal meeting of members of the Board of Direction to appoint such a Committee.)

Resolutions of May 15th, 1903.

The resulting resolutions, passed at a joint conference, May 15th, 1903, were presented to the Board of Direction at its regular meeting, June 2d, 1903, and action taken which was in harmony with the recommendations of its Committee.

"1. *Resolved*, that this Joint Conference Committee recommend to the respective governing bodies represented at this conference, that the following resolutions be brought before the several organizations, to be acted on:

"2. *Resolved*, that (*insert name of organization*) unite with (*insert the names of the other four organizations*) or any of them, for the purpose of accepting the sum of $1 000 000 as a gift from Mr. Andrew Carnegie, for the purpose of erecting suitable buildings for occupancy by various societies of engineers and The Engineers' Club, on the sites secured for the purpose on the north side of Thirty-ninth Street and south side of Fortieth Street west of Fifth Avenue, in the City of New York, in the State of New York.

"3. *And resolved further*, that (*insert name of organization*) has a very high appreciation of this generous gift of Mr. Andrew Carnegie, and this additional evidence of his recognition of the engineering profession and his deep interest in the welfare of the national societies of engineers and The Engineers' Club.

"4. *And resolved further*, that a site on the north side of Thirty-ninth Street shall be purchased and held by trustees, or otherwise as shall be determined by the joint committee hereinafter mentioned for The American Society of Civil Engineers, The American Society of Mechanical Engineers, The American Institute of Electrical Engineers, and the American Institute of Mining Engineers, or by such of them as shall vote in favor of coming into this enterprise.

"5. *And resolved further*, that a joint committee shall be created, to be composed of three members of each organization, that shall unite in accepting said gift of $1 000 000 from Mr. Andrew Carnegie; and that the governing body of (*insert name of organization*) shall elect three members of this organization to represent it on and be members of such joint committee; and that the governing body of (*insert name of organization*) shall have the right and power to remove any member of such joint committee who shall be elected by it and to elect any member of this organization to fill any vacancy that shall occur in such joint committee by reason of the death, resignation, refusal to act or removal of any member who shall have been elected by the governing body of this organization as a member of such joint committee.

"6. *And resolved further*, that the character and internal arrangement of the building to be erected on the site on Thirty-ninth Street shall be determined upon by the affirmative vote of at least two-thirds of all of such of the members of said joint committee as shall represent all of the organizations, other than The Engineers' Club, on such joint committee; and that the character and internal arrangement of the club building to be erected on the site on Fortieth Street shall be determined upon by the affirmative vote of all of the three members of such joint committee who shall represent The Engineers' Club on such joint committee.

"7. *And resolved further*, that said joint committee shall, by the affirmative vote of at least two-thirds of all the members thereof, select and employ an architect to prepare the plans and specifications for the building to be erected on the site on Thirty-ninth Street, and for the club building to be erected on the site on Fortieth Street; and shall also obtain proposals for the erection of both of such buildings; and shall have power to make and enter into such contract or contracts as shall be approved and authorized by the affirmative vote of at least two-thirds of all the members of said joint committee, for the erection of both of such buildings; and shall have charge of the erection of both of such buildings.

"8. *And resolved further*, that said joint committee shall continue in existence until all of the purpose set forth in these resolutions shall have been fully accomplished."

Resolutions of the Board of Direction.

The Board's resolutions were as follows:

"*Whereas*, the resolutions submitted by the Joint Conference Committee in the matter of the Proposed Union Engineering Building are not in suitable form, in the opinion of the Board of Direction of the American Society of Civil Engineers, to be submitted to the Society;

"*Resolved*, That it is the sense of this Board that the proposition, when submitted to the Society, should make definite provision for the accommodations necessary for the present and future needs of the several organizations, and that the proportion of the total expense to be borne by each of the organizations concerned should be definitely stated, and be it further

"*Resolved*, That the Board of Direction recommends, to the Business Meeting to be held at the Annual Convention, the adoption of the following resolutions:

"*Resolved*, That the Board of Direction be authorized to ascertain whether suitable accommodations can be obtained for the Society in the proposed new building, with provisions for future needs.

"*Resolved*, That the Board of Direction be authorized to co-operate to this end with the other organizations concerned.

"*Resolved*, that the Board of Direction be requested, provided it is satisfied that suitable accommodations can be obtained, to send to the members of the Society a letter-ballot by means of which a direct expression of the wishes of the Society in the matter may be secured, and to accompany such ballot by a statement of reasons for and against uniting in the scheme with the other organizations.

"*Resolved*, that the Board of Direction, in case a majority of the members, as shown by letter-ballot, are in favor of uniting with the other organizations, is authorized to proceed in behalf of the Society in carrying out the project."

THE PRESIDENT.—The Chair would suggest that in order to bring the resolutions recommended by the Board before the Convention, their adoption might be moved by some member and then the matter will be before the members for discussion.

G. W. CATT, M. Am. Soc. C. E.—To bring the resolutions before the Society, I move their adoption.

The motion was duly seconded.

THE PRESIDENT.—The question is now before the meeting for discussion.

J. F. WALLACE, Past-President, Am. Soc. C. E.—Mr. President, and Gentlemen of the Society: It is a very embarrassing thing, sometimes, to decline a gift, and it is frequently more embarrassing to accept it. When that gift, however, is coupled with conditions, and particularly when those conditions are complex and not easily understood, we may be pardoned for hesitating and giving it a great deal of careful consideration before we give our full acceptance. The passage of this resolution, as I understand the tenor of it, simply states the case and would put it before the Society for action when it is voted on. Am I right? The refusal to pass the resolution simply places us in a position where, under certain conditions, an answer should be returned to Mr. Carnegie.

The situation, however, is peculiar, in one way, and that is, I do not think, or at least if I am mistaken I beg to be corrected, I have failed yet to see or hear any formal proposition from Mr. Carnegie actually making this offer, as I understand it. Is there an offer of that kind, Mr. President, before the Society? Has there been a formal tender of this amount to the American Society for this purpose?

The President.—The tender was made in a letter addressed by Mr. Carnegie to the several Societies, the four National Engineering Societies and the Engineers' Club. The original of that letter has never been presented to the Board. It has never been presented, I think, to the Boards of any of the Societies. It is a paper that is not desirable to carry around, but the Chair would state that he has seen the letter, and it is a *bona fide* offer, with Mr. Carnegie's signature attached, as the Secretary has read.

Mr. Wallace.—That being the case, of course, it devolves upon us, as a matter of courtesy, to return some answer, and the question we have to face for the Society is what that answer shall be.

As I said before, the passage of this resolution would bring it before the members of the Society for a letter-ballot. The failure to pass the resolutions will bring the matter before the Society as to what answer should be returned.

The general question embraces two elements for our consideration; one, a professional one, and the other, one of expediency. From the professional standpoint we should not forget that the American Society of Civil Engineers is not a technical society. It is a professional institution. We, and those who have preceded us, have been working together for fifty-one years to build up an institution which shall show to the world the progress of the civil engineering profession in America. The Society has a prestige and it represents the best engineers in America. The profession of civil engineering embraces all the technical engineering branches; it embraces all the specialties; and we should bear in mind that it has been our effort to work to the end that it might do so.

We should also bear in mind that we should not be placed in the position of being the remnant of that profession, or what is left after the profession is subdivided into the several specialties which have sprung up, in our country and among the members of our profession, in the last twenty-five years. (Applause.) We should not forget that our Society stands for something, and it stands for the united efforts

Discussion on Joint Engineering Building (continued).

of its members for half a century. We should not, for a mess of pottage, trade that prestige off or do anything that would in any way take away from it. (Applause.)

I speak rather strongly on that subject, because I have always been a non-resident member, and the Society appeals to a non-resident member in two ways; one, as a source of communication with other members of the Society, as a source of information through the papers and publications, and the other through that spirit that brings professional men together, the prestige of the Society, and the feeling of that connection, the feeling that you are a member of the American Society of Civil Engineers that goes with the man that is isolated on the frontier, and helps him to do his work, and helps him to do his duty, and helps him to maintain his integrity, and causes the sun to be less hot, the rain to be less wet, and the air to be less cold when he has difficult physical tasks to perform, and causes him to maintain his integrity alone and without the support of his fellows. There is a bond there, and we do not want to do anything to lower the standards that we have set up.

From the standpoint of expediency, the American Society of Civil Engineers is to-day on a firm financial basis. We have property worth over $200 000, for which we are under no obligations to anyone. We have a small debt, but the surplus which can be set aside from our dues is perfectly able to take care of that. In other words, in a few years we will be debt-free, and we will even have to hunt some source of expenditure to properly spend the money that comes to us from the dues of the members in a legitimate way. We have ample accommodations. We do not need any more accommodations. Our house is located satisfactorily, and the question naturally comes, from the point of expediency, why should we change? We certainly should not unless there is a great preponderance of reasons for our doing so.

The main reason advanced, or we should presume it to be, is to centralize the engineering societies and the engineering interests.

I dislike very much to speak plainly, because I am a member of the Engineers' Club, and I have friends in the other engineering organizations, and I do not wish to belittle their efforts, or to say anything to which they may take exception, but, in the first place, to look at it from simply the commercial standpoint. There is land to buy, which, I understand, will cost in the neighborhood of $500 000—is that right, Mr. President?

The President.—That is about right.

Mr. Wallace.—Yes, about half a million dollars, of which we will be expected to contribute either one-quarter or one-fifth, depending upon how many associations go into it. After the land is purchased, as I understand the proposition, there is to be a million-dollar building erected thereon. As I understand the situation, however, the first part of that money is to be used to provide quarters for an engineers' club, which is practically an engineers' club in name only. (Applause.) I understand that hardly half the members are engineers in the sense that they are even members of the technical societies. It is an institution that is social and largely, or very largely, commercial. (Applause.) There will be left for this Union Engineering Building the residue after the quarters of this social and commercial association are provided. Dividing that space or those quarters by four, as I understand it, we will be in possession of less cubic feet of building for our accommodation than we now have in our present location. We will only have one-quarter of a voice in the management of that building. We contribute a library. The assembly room and all the general facilities of that building are open to a membership that will probably be, in a few years, from 12 000 to 15 000 people, scattered all over this country. We, of course, will have our meetings exclusively. We will still be the American Society of Civil Engineers, but it seems to me that an affiliation of that kind rubs something off the bloom of the peach (applause), or, at least, that is the way it appeals to a non-resident member, in the West.

Looking it over, looking all sides of it over, there does not seem to be any proper reason why the American Society of Civil Engineers should go in and share and share alike with the other organizations that are interested in this matter. I can see plainly why it would be a very desirable thing for the Engineers' Club; I can see plainly why it would be a very desirable thing for the Mechanical Engineers, or for the Electrical Engineers, or for the Mining Engineers, provided they desired it, or for all of them combined, to have the lump leavened with the American Society of Civil Engineers. I cannot see why the American Society of Civil Engineers should leaven the lump.

If it is desired to ask for our co-operation, instead of our affiliation, that is another matter. If we could contribute, or obligate ourselves for some sum toward this building, say $50 000, if you please, or any moderate sum that we could raise ourselves, and help these gentlemen bring about a union building, and have our sub-quarters in it, if you please, and help them in every way, I would be most heartily in favor of it; but I think we lose something in dignity, we lose something in professional prestige, and we will surely lose something in our ability to control our own affairs, and the room in which we live, and the house in which we live, if we enter into a close affiliation of the kind set forth in these resolutions and provided for in this proposition. (Applause.)

George H. Pegram, M. Am. Soc. C. E.—Mr. President, and Gentlemen: There seems to be a good deal of misconception as to what the conditions are under which we are asked to accept this proposition. Mr. Carnegie has apparently provided no conditions except that the participating bodies shall procure the land.

Discussion on Joint Engineering Building (continued).

Some suggestions have been made as to how the libraries should be treated, that is, that they might be put in adjoining rooms, but still there are no conditions as to that. There is nothing in the way of each organization owning and keeping its library intact, as it does now. In fact, the only proposition now is the joint tenancy of that building. There is no question of affiliation involved. The other societies, that is, the Mining Engineers, the Mechanical Engineers and the Electrical Engineers have practically adopted those resolutions that were originally presented to our Board of Direction and were rejected by our Board as not suitable in their present shape to present to the Society. These three societies have practically accepted them and appointed the joint committee that is to confer and to direct the execution of the project. The Engineers' Club was to have acted last night, and probably did so, as they practically drew up the resolutions and have been in favor of them all along.

That, then, leaves it with the four organizations, that is, all the organizations except the American Society of Civil Engineers, with their permanent committees appointed. All along they have assured us that whether we came in or not, it made no difference to the carrying out of the project. A Committee, really of information, was appointed at an informal meeting of the Board of Direction, when the matter was first brought to our notice, and they directed the President to appoint two members to act with himself. The President appointed Mr. Wilgus and Mr. Freeman, but Mr. Freeman, being a member of the Board of Direction of one of the other societies, declined, and I was appointed in his place.

Mr. Freeman, at that meeting represented, probably as Mr. Wallace has, the sentiment of his locality, and we were rather surprised to find such a unanimous sentiment in Boston, because in New York we felt that everybody was pretty much at sea. Apparently, none of the Boston people are here—I don't know whether they are here or not—but Professor Swain, who was present at the meeting of the Board of Direction which adopted these resolutions that have been presented to-day, has sent a letter to our Committee giving the sentiment of the Boston members as far as they could determine it, and in his absence I think it would be proper to read that letter here if there is no objection, Mr. President.

Letter from Geo. F. Swain.

This is from Professor Swain, and it relates to a telegram that was sent to him at New York from Boston, while he was in attendance upon one of our Board of Direction meetings. It says:

"BOSTON, MASS., June 4, 1903.

"Mr. ALFRED NOBLE,
"20 West 34th St.,
"New York, N. Y.

"MY DEAR MR. NOBLE: I am very sorry that the telegram which was sent me from Boston, containing the result of a canvass of the members there with reference to the Carnegie proposition, was not delivered to me Tuesday evening. You will be interested in its contents, which were as follows:

" 'Result of ballot of acceptance, Carnegie offer,
'In favor, 47;
'In favor with present information, 33;
'Non-committal, 7;
'Opposed with present information, 7;
'Opposed, 9.
'S. E. TINKHAM.'

"This is a result which is a little surprising to me and is very satisfactory; and I think it shows one thing quite conclusively, and that is that the Society should pass the resolutions which we voted Tuesday evening to recommend to the meeting at Asheville. I think likely some of the members who are opposed to the plan would like to reject it entirely and have nothing whatever to do with it. I sincerely hope, however, that the Society will have more discretion. Personally, I thoroughly believe in the scheme in principle, but of course the practical details must be worked out before we can definitely enter into it. Personally, also, I believe that these details can be worked out. I think the spirit in which we should approach it is an earnest spirit of appreciation and a sincere desire to make the scheme a success, and that, if we approach it in this way, we can make it a success. On the other hand, if we start in with the hope and the desire to pick flaws and to defeat the scheme, we might be able to do so.

"I thought you might be interested in this result showing the feelings of the Boston members, and I send it to you for the reason that I cannot go to Asheville, and I thought it might be of some use to you if necessary to persuade the Society to take the initial steps and pass our resolutions. I am sending a copy of this letter to the other two members of your Committee.

"Very sincerely yours,
"GEO. F. SWAIN."

I would say in explaining those resolutions which were offered, that the Board of Direction, or rather the Committee appointed by the Board, asked the opinion of counsel as to the legal procedure and as to certain questions about which we were in doubt; for instance, whether, if we accepted and became one of the proprietary bodies and had a joint committee in which we would always be in a minority, we might, if such a condition became distasteful, withdraw, without the loss of what we had put in. The opinion of counsel and answers to those questions, and also with reference to these resolutions, I probably had better read, Mr. President. This was obtained for information only; in fact, our Committee has been simply one of information. This is addressed to Mr. Alfred Noble, President.

Letter from Counsel.

"NEW YORK, June 2, 1903.

"ALFRED NOBLE, Esq.,
"20 West Thirty-fourth Street.
"New York City.

"DEAR SIR: In the matter of the proposition of Mr. Andrew Carnegie to erect a union engineering building, you ask me as to the effect

Discussion on Joint Engineering Building (continued).

of resolutions of substantially the following purport, if adopted by the American Society of Civil Engineers at its general business meeting:

"(1) A resolution authorizing the Board of Direction to ascertain whether suitable accommodations can be obtained for the Society in the proposed new building, with provision for future needs.

"(2) A resolution authorizing the Board of Direction to co-operate to this end with the other Societies.

"(3) A resolution requesting the Board, provided it is satisfied that suitable accommodations can be obtained, to send to the members of the Society a letter-ballot regarding the proposed new building, accompanied by a statement of reasons for and against uniting in the scheme with the other Societies.

"(4) A resolution directing the Board, in case a majority of the members, as shown by letter-ballot, favor the project of erecting the new building, to proceed with the other Societies in the erection of the building.

"I have no hesitation in saying that such resolutions so adopted would be in harmony with the Constitution of the Society and that the Board of Direction would, upon the adoption of the resolutions, be legally warranted in acting in conformity with the resolutions.

"You ask what would be the situation if one of the other Societies mortgaged its interest in the new building and defaulted in payment under the mortgage.

"You also ask me what would be the situation in case of the withdrawal of one Society.

"I venture the suggestion that an agreement can doubtless be framed covering the foregoing points, with such others as may occur, in a way to safeguard the Society's property interests provided the Carnegie proposition is accepted.

"It would be not only the right, but the imperative duty, of the Board of Direction to insist upon the execution by the other Societies of instruments necessary to protect the American Society of Civil Engineers, as a condition precedent to committing that Society to a fixed plan.

"Yours truly,

"Herbert E. Kinney."

There are some other communications, Mr. President, which have come to our Committee, if it is proper to read them.

The President.—You may read them.

Mr. Pegram.—Here is a telegram received from New York, addressed to Mr. Noble:

Telegram from several Members.

"We, the undersigned, members of the American Society of Civil Engineers, without now expressing our preference for or against the Society's participation in the gift of Mr. Andrew Carnegie, to the cause of engineering, most respectfully recommend their fellow members, assembled at one of its regular general business meetings, that the question be submitted to the entire membership by letter-ballot without unnecessary delay, as such action, in our opinion, and according to competent legal advice is fully warranted under our Constitution; and, moreover, it is the individual right of every member to have the opportunity to vote on so important a matter.

"Henry G. Prout, Charles Macdonald, S. Whinery, John Fritz, O. F. Nichols, D. L. Hough, John Bogart, W. E. Baker, John F.

O'ROURKE, GEORGE W. MELVILLE, A. MACKENZIE, GEORGE A. JUST, FOSTER CROWELL, W. L. SAUNDERS, M. LEWINSON, ROBERT B. STANTON, D. McN. STAUFFER, L. L. BUCK, E. E. OLCOTT, EMIL KUICHLING, E. G. SPILSBURY, J. WALDO SMITH, BERNARD R. GREEN, JOHN THOMSON, A. P. BOLLER, H. W. HODGE, GEO. W. MCNULTY and WILLIAM METCALF."

CHARLES HANSEL, M. Am. Soc. C. E.—Do you offer this as a resolution?

MR. PEGRAM.—No, this is simply information that has come to the Committee from members who cannot be present.

MR. HANSEL.—I understand they asked that it be offered as a resolution.

MR. PEGRAM.—Well, the course outlined in the resolutions before you is to this same end, that the matter be decided by letter-ballot.

MR. GREEN.—Mr. President, my name is attached to this telegram, and I wish to explain that I gave a very hasty answer, yesterday afternoon before leaving Washington, to a telephonic communication which did not give me quite all the information that is contained in that telegram. I am willing to vote for the letter-ballot in proper time, but not immediately, and therefore, as the thing now reads, I would rather my name should be withdrawn from among the signatures.

THE SECRETARY.—I have two letters that were addressed to the Board of Direction, one from Past-President A. Fteley, and one from Mr. E. L. Corthell.

Letter from A. Fteley.

"May 31st, 1903.

"TO THE BOARD OF DIRECTION OF THE AM. SOC. C. E.

"SIRS. Allow me to contribute a few words, as a member of the Board of Direction, to the discussion of the Carnegie proposition which is to take place at your next meeting.

"The perusal of the pamphlet sent me by President Noble suggests the thought that the whole matter was started and prepared, almost entirely, without consultation with any authorized member of our Society; probably in the expectation that the glamour of the munificent offer made could prevent all possible opposition, if any were intended.

"That other bodies, differently situated in material prosperity or otherwise, think it out of the question to refuse the offer made, I easily conceive, and, from the statements made to him, Mr. Carnegie probably received the same impression.

"I feel confident, however, that it would be against the best interest of our Society to follow the others in the acceptance of the pending proposition. We have worked many years to build up our organization and we have now reached, professionally, financially and materially, a desirable position with which we should be satisfied. To now partially lose our distinct identity and to unite with other bodies, some of which have not the same aims as ourselves, would be of no advantage to us and might be of detriment.

"I fail especially to see the propriety of uniting with the Engineering Club. Admirable as it may be in its own sphere, its aims

Discussion on Joint Engineering Building (continued).

and methods are obviously different from ours; it is not a professional organization, and, as it would actively occupy its part of the proposed building every day in the year, it would obviously appear to outsiders to be a representative body and would give to the whole a social and festive character which we do not care to assume. Many of its members, I understand, are commercial representatives of firms, the sale of whose goods and products are controlled by Engineers, and an apparently close association would hardly be consistent with the 'maintenance of a high professional standard' mentioned in our Constitution as one of the main objects of our Society.

"The whole subject has been treated with undue haste. In the pamphlet sent me by the President, and in the press references which have reached me, I have not seen a word in regard to the financial management of the proposed building. The equipment and maintenance of such a large establishment is very expensive, and, from what I know of the financial resources of the bodies invited to join the Union, they would have to increase substantially their annual outlay in order to meet the expense of the annual maintenance and the gradual extinction of the debt contracted for the purchase of the land.

"A number of financial and legal questions connected with the joint ownership and management of the property would necessarily arise and should be inquired into before launching into such a radical change as is now proposed. Competent legal opinion alone can define the legal status of the various members of the joint ownership.

"With hopes that the call of the Board for an expression of opinion by the members of our Society will be accompanied by such a sober and judicial statement as will convince them that it is for our own best interest to retain in full our present identity, and counteract any contrary argument that may be sent independently to them, I remain,

"Yours respectfully,
"A. Fteley,
"M. Am. Soc. C. E."

Letter from E. L. Corthell.

"Great Barrington, Mass., May 29, 1903.

"To the Board of Direction,
"*American Society of Civil Engineers,*
"220 West 57th St., N. Y. City.

"Dear Sirs:—I desire to present briefly my views in regard to the proposal to accept from Mr. Carnegie $1 000 000 for the purpose of building a joint house for the National Engineering Societies of this country and for an Engineers' Club.

"As the matter now stands, as it has come to me largely through the public press, I am not in favor of the proposition. I do not think our Society should unite in as intimate relations as are proposed, with the other national societies, for the reason that its standing, its requirements and its purposes are considerably different. I need not go into details in respect to these differences. I cannot better express my own views in regard to these differences than by referring to the presidential address of Mr. George S. Morison delivered on June 19, 1895, and found on page 477 of Volume 33. On that page in two paragraphs he shows clearly the difference and brings out, I think, better than I can possibly do, the reasons why it would be improper to unite in any close relations societies of such different character. He says:

"'Our Society should include the choicest minds in every branch of engineering; it must have among its members the leading members of every society which represents an engineering specialty. No other society can have our general range; on the other hand, no other national society can make the same restrictions as to individual requirements. Each of the other societies is devoted to some specific branch of engineering. but the individual qualifications should be comparatively light; it receives into its ranks every engineer working in its specialty, as we receive engineers of every specialty, but not every engineer.

"'The American Society of Mechanical Engineers accepts as a member anyone who is 'competent to take responsible charge of work in his department;' it is not necessary that he should be able to design, and while this would be a bad provision for our Society, it is exactly right for the Society of Mechanical Engineers. We take in educated men of every branch of the profession; each other national society takes in every man who is devoted to the specialty which that society represents.'

"These are exactly the relations which exist between the Institution of Civil Engineers of Great Britain and the other societies that have to do with special features of engineering. I cannot conceive of that institution uniting closely with these other societies. I do not believe that any financial temptation—a million or ten million dollars —would be looked upon with favor for a moment by that great Institution, and we are equal to it in every respect so far as requirements for admission, professional standing of the members and other important features which distinguish it from other societies are concerned.

"In 1895, when I endeavored to establish an international institute of engineers and architects, I found that in order to establish any relations at all between the engineers of different societies and of different countries it would be necessary to keep the societies of a high and low grade separate, as they are now, but individual members of these societies could, for the purposes stated in my proposition, be united in an institute, but that it would be necessary to make the requirements for admission as low as possible, and they were to be simply, 'Any person engaged in the profession of engineering or architecture, of mature age and of good character.'

"If it were possible to change the constituent features of the various societies which it is proposed to unite so as to bring them up in requirements, in character, in experience, to the American Society of Civil Engineers, I think the proposition should meet with the approval of our Society, but it is impracticable to change these other societies; consequently we will have to go down to their level, and that we cannot do.

"I hope the views very briefly expressed above and my opinion will be in accord with your own, when the matter has received full study and discussion. I am,

"Yours respectfully,
"E. L. CORTHELL,
"*M. Am. Soc. C. E.*"

MR. CROES.—Mr. President, when this matter was first called to my attention my feeling was one of surprise at the maturity of the

Discussion on Joint Engineering Building (continued).

project, apparently, as presented, without any previous notice having been given to any of the parties concerned. On examination, it appeared that an after-dinner speech by the President of the Electrical Engineers appealed to Mr. Carnegie's feelings, and he sent for Mr. Scott the next day and told him that he would like to aid in erecting a union engineering building for the engineering societies. Mr. Scott called in a very few members of those various societies, and although he was told, and Mr. Carnegie was told, that the American Society of Civil Engineers had, for twenty years, been considering the proposition, and had every time refused to enter into a union building, the majority of the gentlemen consulted thought that the thing might be worked out, and so they had gone to Mr. Carnegie and he, thereupon, wrote a letter which you have heard read, to the four Engineering Societies and the Engineers' Club, a purely social and commercial organization, which was then negotiating for the property on Fortieth street, in New York City. That proposition was held by the gentlemen who received it until a site in immediate proximity to the Engineers' Club could be obtained, or options on it could be obtained, so that it might be purchased and be preserved for the erection of a union building for the five organizations.

The property of the Engineers' Club fronts on Fortieth Street, 50 ft. by 99, and the contiguous property which the engineers are to occupy is on Thirty-ninth Street and is 125 ft. by 99. The two plots are backed up against each other. The union building must run through from street to street, with an entrance on Fortieth Street and an entrance on Thirty-ninth Street.

When this option had been obtained, an announcement was made, on May 3d, that such a project was under way. A meeting was called of all the directors of all the various societies concerned, to take place three days later, on the 7th of May; the time was fixed; the place was fixed—the house of the American Society of Civil Engineers. The American Society of Civil Engineers did not know anything about it. On the 5th of May the Board of Direction of the American Society of Civil Engineers met and, finding that a meeting had been called, agreed to invite the gentlemen to attend it, and requested that some members of the Board of Direction attend the meeting to see what was going on. They did so. They found that on three days' notice the Board of Direction was called upon to adopt a set of resolutions carefully prepared, stating that the American Society of Civil Engineers and the other societies, officially assembled, accepted the proposition of Mr. Carnegie, and they also had a cablegram prepared, which was to be forwarded to Mr. Carnegie, that the members of these societies, officially assembled, accepted his offer with thanks.

Some of the members of our Society and members of the Board of Direction were present, and as those resolutions and that cablegram were entirely untrue, they succeeded in securing the substitution of a resolution thanking Mr. Carnegie.

Now, the proposition which was submitted at that time and presented to that meeting and made public, as I said, three days before, was an elaborate scheme drawn up by a lawyer for the management of the whole thing, and providing for the election of trustees who were to be, I believe, perpetual – at any rate they were practically self-appointed to carry out the whole project.

Without any regard to anything else I will say that that movement was not timely, and one of the greatest philosophers of modern days has said that "our words and actions, to be fair, must be timely." These were not timely. There was not an opportunity given for discussion. Well, that was not passed, of course.

On examination, I found that there were not a dozen members of the American Society of Civil Engineers who knew anything about this, and while there were publications issued, and some of them appeared in the public press, and some pamphlets were sent out, there was not any general information regarding the project which involved the reversal of the policy of the American Society of Civil Engineers from its foundation; and we were told, and it was urgently impressed upon everybody connected with the government of the American Society of Civil Engineers, that it was absolutely necessary that that project should be accepted at once, and certainly within thirty days, because the option on the piece of land which the gentlemen of the Engineers' Club had selected as a good one for the Society house would expire within that time. On inquiry, I found that there was not any such hurry at all; that Mr. Carnegie had said that if any one society did not choose to come into it, that his offer held good for the others; and, as we are not under boss rule, or under clique rule, but are a democracy where every man has a voice in the management of the Society, it was necessary for us to take a popular vote on the subject and to have the approval of all the members.

Well, I thought under those conditions that it would be well to feel the pulse of the men who had taken part in the growth of the Society, men who had built it up and who had held official positions in it and who were more intimate with its affairs than anybody else could be, and so I addressed to a number of them a letter stating somewhat concisely the condition of affairs, reciting in the first place what I have just said to you of the manner in which the proposition was brought about, and then making this proposition:

"It is important that the members of the Society should carefully consider the proposition in all its bearings, and that they should be prepared to uphold the old established policy of the American Society of Civil Engineers unless some very strong argument can be brought forward in support of a reversal of that policy.

Discussion on Joint Engineering Building (continued).

"That policy may, I think, be thus stated: The Society is not an educational institution, nor a commercial exchange, but an association of men who have acquired such an education and practical training in any branch of civil engineering as to warrant their being classed as members of a profession, and not simply as expert mechanics, or skillful tradesmen. Juniors and Associates are affiliated with them, but not on a membership basis, and they have no voice in the management of the Society. The full membership of the Society is intended to carry with it, so far as practicable in any such organization, a guaranty of the mental, moral and practical fitness of a man to be ranked as a professional civil engineer. It is not consistent with the aims and purposes of this Society for it to be associated with other organizations having a lower standard of membership, in such a way as to lead either the members of such organizations or the general public to assume that all the persons so associated stand on the same professional plane.

"It is an indisputable fact that while there are in the various other engineering societies many members who rank as high, professionally, as any members of the American Society of Civil Engineers, and a very considerable number, 250, about, are also members of the latter society, the only reason for the existence of the other societies is that there have been and now are a great many men who feel the need of an Association, but are either unable or unwilling to comply with the requirements of the American Society of Civil Engineers as to full membership and who wish to be members of only such an organization as will accord to them the privileges of the highest grade of membership and participation in the control of the organization."

There always must be a number of societies in the same branch of business, whatever it is, but they are societies of different grades. We have a standard, as Mr. Wallace has well said, which the other societies have not.

"The American Society of Civil Engineers has never been disposed to engage in any business or professional alliance with such societies of such a nature as to lead to a general impression of the equality of the professional standing of all the parties to the alliance. It is now proposed that the American Society of Civil Engineers shall unite with the other technical societies and with also an unprofessional, social and commercial organization in the acceptance of a gift of a building to be occupied by them in common. In the deed of gift all the societies are grouped as co-ordinate and equal. In the scheme of co-operation proposed by the promoters of the project, all the recipients of the gift of the house are designated as tenants in common, share and share alike. The libraries are proposed to be merged in one, and the auditoriums are to be used by all alike. The purchase of the land on which the building is to stand is to be shared in by all.

"Leaving out of view the moral considerations which have heretofore influenced the action of the American Society of Civil Engineers in this matter, and considering only the business features of the proposed arrangements, it appears that, of the five participators in this arrangement, the American Society of Civil Engineers owns and occupies a commodious house, built for its use, which is valued at $250 000, and has on it a mortgage of $55 000, which is being paid off rapidly from current receipts. It also has a library of over 40 000 volumes, valued at $50 000.

"The Mechanical Engineers own property valued at about $80 000.

The Mining Engineers own no property, have a small library and say they don't want a building. The Electrical Engineers own no property, are understood to have a building fund of $30 000, and have begun a library. The Engineers' Club owns no property and has no library worth mentioning.

"It appears, therefore, that the one successful, well-conducted and prosperous organization of the group is asked to go into partnership with four other concerns which have not demonstrated their ability to acquire or manage a large property, in the purchase of three-quarters of a million dollars' worth of land, and in the control and management of the million-dollar house.

"This proposition does not proceed from the party in interest which has now cash and credit, but from some of the others who wish to be associated with that party, and who have, at the outset, attempted to enforce an immediate acceptance, saying 'that the details can be arranged afterward.'

"I believe this is a fair statement of the case as it stands, and I would be glad to know from you whether you think it desirable or consistent with the best interests of the Society to entertain the project of an affiliation with the other societies above named in the manner proposed."

I make that statement to you that you can see precisely whether or not I was fair in the statement. I expressed no opinion in it except what comes by inference. (Laughter.)

Now, looking over the persons to whom to send that, I thought that good men to send it to were the eight survivors of the nineteen men who were elected Members of the Society at its revival in 1867—December 4th, 1867—when the Society was revived after being in a comatose state for some ten or twelve years. There were nineteen men elected, and eight of those still survive. One of them took an active part in the reorganization and in the management of the Society, and has been a director and a Vice-President, and has contributed to the funds of the Society by subscription for the building in Twenty-third Street—and right here I might as well say that the building which we own now was not built by subscription. The building in Twenty-third Street was largely purchased and enlarged from subscriptions obtained from members and from others, but the present building was built by the Society out of its own funds, only $19 243 being contributed by subscription, and it is being paid for out of its own funds (applause); it is not the gift of anybody.

Letter from Thomas Fitch Rowland.

Well, this gentleman I speak of also contributed a fund for founding a prize for the Society, the Rowland Prize, and he is now an Honorary Member of the Society, for I speak of the Hon. Thomas Fitch Rowland, an Honorary Member of the Society; and he wrote in reply a letter which I ask to have incorporated in the minutes of this meeting.

"I had already given the subject upon which you address me, much earnest thought, and have carefully perused your letter, and the printed article, over your signature, copy of which you enclosed.

Discussion on Joint Engineering Building (continued).

"I am firmly of the opinion that it would be a dire calamity to the welfare of The Am. Soc. of C. E., were it to assume any part in the schemes now in vogue, to entice it from its high estate, and signally commanding position of being *the oldest*, most distinguished, and world-wide known Society of Engineers on the Western Hemisphere.

"Were I in proper health, I should most certainly make it my business to visit Asheville, upon the occasion of the coming convention, to do whatever I could, in the way of convincing gentlemen there assembled, that such co-partnership, or 'community of interest,' as has been proposed, would, in my opinion, be fatal to the best interests of our Society, and would be a monumental mistake, that would mark the primal epoch of a departure, from the true line upon which our Society has always traveled, of minding its own affairs, and perhaps might possibly be indicative of the Society's approaching decadence.

"I am unable to travel, and in such indifferent physical condition, as to be debarred from taking active interest in Associations, or other business matters, but I earnestly agree with you, in all your adverse criticisms [Mr. Rowland had also read at that time a letter which I addressed to the public press, in which the same sentiments were expressed, but with an opinion. In writing to the members of the Society, I was careful not to express an opinion. In writing to the Press I was careful to express that opinion as forcibly as I could], and heartily hope The Am. Soc. of C. E., will make no arrangements, to in any way become identified in any co-partnership, or any 'community of interests,' with other Technical Societies.

"Although a third of a century has rolled away, I vividly still remember, the satisfaction and pride with which you and several other gentlemen (who are yet alive) together with myself, accepted invitations, and upon December 4th, 1867, became elected Members of The Am. Soc. of C. E., and ever since, as opportunity has presented, each and all, so far as I can recall to mind, have done whatever they could, to help build up this noble Incorporation, which has long been recognized throughout the business world, as an Engineering Society of the highest type, whose transactions and technical literature, often become consulted by Government Officials, Civic Associations, Capitalists and others, who have been thereby enabled to obtain the best of professional data, and engineering experience of the Society's members.

"In conclusion, I repeat my earnest accord with all of your adverse criticisms. and certainly hope the Society will make no radical change in its status, or general methods of administration, under which it has grown from feeble infancy to its present stalwart proportions."

I place that letter first because it is from an Honorary Member who for thirty five years has taken an active part in the management of the Society, as you know, and because another opinion had been expressed by one of our Honorary Members, Mr. John Fritz. Now, Mr. Fritz, for twenty-five years, while the Society was attaining its present position, never by word or deed gave any aid to the American Society of Civil Engineers, and it was not until ten years ago, after he had passed the allotted life of man and was over seventy years of age, that he applied for membership in the Society. I think that the opinion of that Honorary Member who has taken an active part all the way through is to be preferred to that of one who has taken no part whatever.

Letter from Charles Paine.

I addressed the letter to another one of those eight men, Mr. Charles Paine, a former President of the Society, whom you all know. He replied:

"I am of your opinion that the A. S. C. E. should remain free and independent. Its members can enjoy all the advantages of the other societies by simply joining them; and if they wish to lunch at the Club, they will be admitted on the usual terms. The proposal to unite the A. S. C. E. with the other societies could only come from persons who do not conceive the purpose for which the A. S. C. E. was organized. The older members of our Society will know how difficult it has been to maintain the standard of character and to avoid the desire of young (and even of older) members to advertise themselves or their inventions by means of *papers*. Those things are permitted or occur more or less in the proceedings of some of the other Societies; and would affect the estimation in which our Soc. is held, if a near association were established. No scheme for a complete independence of administration has been suggested; if there were such an independence provided for, the A. S. C. E. would have nothing more than it has now, and gain nothing important. The Association for the Advancement of Science, which is every way an important organization, might as well say to the Academy of Sciences, 'let us swallow you, we are more numerous'; or the League of Artists, to the National Academy of Design, 'let us rule your affairs,' as to have the 4 Engr'g associations propose to meddle with the A. S. C. E.

"I am aware that they do not propose this meddling now, except in the joint administration of property; but the same sentiment which makes me prefer to have a separate dwelling for myself makes me prefer a separate home for the A. S. C. E. In my opinion the cause of Engineering as a profession will be served by maintaining the A. S. C. E. independent and free of all entangling alliances."

Letter from Mendes Cohen.

Another of those first members was Mr. Mendes Cohen, a Past-President of the Society. He writes:

"Through a personal letter from the editor of one of the technical journals, I learned of the inclusion of the *Engr's' Club* in the scheme. I replied that I could conceive of no possible advantage to the Am. Soc. C. E. of being associated with a social club in a business arrangement of such importance. That on the contrary I saw many and grave objections thereto.

"I had not been well and it did not suit me to prepare my views for publication as I was invited to do, but I am unalterably opposed to such an affiliation, and with that feature fixed as part of the combination I would most strenuously oppose any co-operation in it on the part of our Society.

"I regret that it will not be possible for me to be present at the Convention, where I would be glad to join you in opposing the scheme."

Letter from G. S. Greene, Jr.

Another was Mr. George S. Greene, Jr., for many years Engineer-in-Chief of the Dock Department of New York City, and a Past Vice-President and Treasurer of the Society, and you may see that the questions on which I asked his opinion are distinctly stated in his preamble.

"You ask for my opinion in regard to the American Society of Civil

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Engineers joining with three other technical Societies and a social club in the ownership, control and management of a home in this city.

"The American Society of Civil Engineers is the oldest and it is the most dignified of the technical societies considered, in that it has a high standard and requirement of eligibility to full membership, while at the same time it is broad enough to embrace all classes of members that the other societies include.

"It has its own house, under its own control, sufficient for its purposes and capable of enlargement when there is need.

"It has its own library under its own control and management.

"It is not in any pressing need of money.

"It is independent, and the leading society.

"It is proposed that it become one of five in the occupation, control and management of a house and of a library for the sake of the advantage of whatever share of one million of dollars, (less whatever it may have to pay for land), may be allotted to it by the majority vote of four other societies and itself.

"It cannot become one of five without losing its independence, its prestige and its leading position, and thereby decreasing its ability to benefit the profession, and the commonwealth. It would lose much and gain but little if anything consequential.

"Whatever the other societies may do, I hope that the American Society of Civil Engineers will maintain its present position."

Letter from Henry G. Morris.

Another was Mr. Henry G. Morris, of Philadelphia, an engineer, machinist and mechanical engineer. He said:

"I agree with the general terms of your position as to the desirability of entering into a business partnership with other organizations, as has been proposed.

"The action of the Board in appointing a Committee to investigate the proposition, seems to have been well taken, and, of course, as a democracy, the members will bow to the opinion of the majority, when the results are expressed by the ballot.

"If there is any intention of having 'Carnegie blown in the front'—as remarked by Mr. Dooley in his article on Carnegie Libraries—I would certainly strongly object to a combination such as proposed.

"I much regret that I will not be able to be at the Convention at Asheville, but I feel satisfied that the older and conservative members of the Society will be well represented."

Letter from Edward P. North.

Mr. Edward P. North, a Past Vice-President, and one of the original eight, wrote as follows:

"When you honored me with your communication on the affairs of the American Society of Civil Engineers, you knew that for more than 20 years I have advocated making provision in the Society house for the special engineering societies, but without putting in peril our eminently respectable position or capital. The generous offer of Mr. Carnegie may make some combination between the four national technical societies possible in the near future.

"On the other hand, I fully agree with you that allowing a non-technical club to intervene in the affairs of the American Society of Civil Engineers is impossible. And the plan for 'a suitable Union Building for them all' should be so modified that the affairs of the Engineers' Club are permanently segregated from those of the American Society of Civil Engineers. Nor do I fully approve of the proposed proximity of our meeting room with a club house, which, while it may not be injurious to men of mature years and well-established habits, does not seem desirable for those younger men who are just entering their profession and whose attendance at our meetings has so far proved beneficial.

"Writing from my standpoint, as desiring an advantageous arrangement between the four national societies, it seems the first thing is to settle its practicability and then settle the forms and terms of the co-partnership. When planning work for which there is no precedent, all possible difficulties should, as far as possible, be foreseen and provided against, and these provisions should be criticized by one who has not made the plan.

"This proposed partnership involves a problem with which we are all inapt. It is an absolutely new proposition, out of our experience, to be governed by the laws relating to associations, in which laws few or none of us are expert. And safeguarding the rights of the parties to the real estate and the proposed common house standing on it will probably present questions for which there are no legal precedents. It was with these difficulties in view that at the meeting of the 7th inst., to which you refer, I advised that before any of our capital was merged in a common undertaking, a sum at least equal to one year's income on that capital should be expended on legal advice.

"With these views I am obliged to return a qualified answer to your question, viz.: I do not think it is desirable or consistent with the best interests of the American Society of Civil Engineers for it to entertain the project of affiliation with the other societies above named in the manner proposed. But, after the terms of a possible affiliation between the four technical societies have been arranged under competent legal advice, I think the proposition should be submitted to the Society. The project is too important to us, its disadvantages too patent, and its advantages too doubtful for the hurried action wished by some.

"While I am unable to agree fully with all of your views, I think all the members of the Society should read them, and hope the fact that you are a member of the Board will not prevent your asking the Board of Directors to give your communication publicity in the Society."

Letter from Alfred P. Boller.

There is yet another one of those early members who was at one time, for a couple of years, the Secretary of the Society, Mr. Alfred P. Boller. You all know him, and I don't think that any of these men whose letters have been read, while they are old members, can be said to be "veterans who lag superfluous on the stage," because they are all still actively engaged in work. Mr. Boller wrote:

"Answering your favor *in re* the momentous step proposed to the Society looking to a partnership arrangement with its sister Engineering Societies. The subject has been much in my thoughts, and between the conservatism natural to a veteran, and a recognition of progress as a law of healthy development, I find it hard to come to a concrete conclusion. The project has much to commend it, and if wisely carried out, will I think strengthen a public appreciation of the professions on which modern civilization has been built up. Our Society has had a phenomenal career and has been built up on a standard of membership that is unique among Am.

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Societies, and which has put us in the front rank. Further, we have been wisely financed until our resources have become most substantial, and increasing steadily. We ourselves do not need the gift, and will continue to grow as long as the present policy and traditions of the Society are maintained, and the first impulse is to let well enough alone. Is there a broader view and a responsibility to the profession of Engineering as a *whole*, of which we are now practically only a subdivision? I think there is, and am inclined to endorse a great Union Building on certain conditions, having in view our greater financial responsibility, which is fully twice as great as all the other Societies combined.

"1st. Our position as the representative Society of Civil Engineers must be maintained, just as it now is.

"2d. The ground rent (Mt'ge) while probably safe in Carnegie's hands, after he is gone may be a source of future trouble—unless he makes a provision that it shall never be made a danger ground for the 'combination.' If this can be done, it goes a long way toward eliminating the financial inequality and unequal responsibilities of the Societies.

"3d. Absolute separation from the Engineers' Club or any mixture whatever with that Social organization that would group it as one of the 'Engineering Societies.'

"The fund must be absolutely separated, so that the Engineers' Club does what it likes with the part dedicated to its purposes, and and the Engineering Societies with theirs. The buildings must be separate and distinct, and in no way mixed up. The Engineers' Club as such must not be in the Board Trustees or management of the Societies' building. I am strong in my opinions as to this branch of the subject, as the Engineers' Club seems to be very aggressive in instructing the Engineering Societies what they should do, and manifest an expectation of being established as a collateral branch of the Technical Societies. Of course it would be a mighty good thing for the club, but should be guarded against. As a matter of fact I have never been more puzzled as to just what we should do. I hate the thought of giving up our building and separate independence, but the younger men and changed conditions must be fairly considered. But I would make it a '*Sine qua non*' that the conditions of the ground rent should be such that at *no* time could the property be foreclosed, nor the Societies ever be restrained in the full enjoyment of the building, should conditions at any time arise, interfering with the paying of interest either in whole or in part."

Letter from Thomas C. Keefer.

I further sent this letter to the Past-Presidents of the Society who are living, and had not already publicly announced their conclusions, as I thought they were men who ought to know something about it, and have opinions that were worthy of consideration. In reply Mr. Thomas C. Keefer wrote:

"I agree with your view of the position. You have nothing whatever to gain and very much to lose in such a merger. It would be like abandoning a Home for a Hotel.

"There is nothing, not even a Library, that you could afford to hold in common with other independent bodies, as there would be sure to arise dissension out of the joint use of apartments held in common.

"We have succeeded in having 'thrown out' by the Private Bills Committee of Parliament here, a Bill to incorporate a 'Dominion

Institute of *Amalgamated Engineers'* by showing that the Canadian Society provided, as does the American, and the British Institution, for all classes of Civil Engineers."

Letter from Octave Chanute.

Another Past-President, Mr. Octave Chanute, wrote thus:

"My first impression was that the American Society of Civil Engineers might lose so much in disposing of its present building, that it was so well provided for and so well off financially, that it could afford to abstain from participation, and thus allow other Engineering Societies not mentioned, such as the Naval Architects and Marine Engineers, the Military Engineers, the Engineering Education Society, etc., etc., to avail, with the three other National Societies mentioned, of Mr. Carnegie's magnificent gift, for which all members of the Engineering profession must be profoundly thankful.

"My second thought was that the holding aloof by the American Society of Civil Engineers might impair Mr. Carnegie's intentions, and that the first requisite step would be to learn his views.

"Your statement that the proposal involves the purchase of half a million dollars' worth of land by the connected organizations further modifies my opinion. Moreover, I see in *Engineering News* of May 21st, just received, that a Joint Conference Committee of the Societies interested has passed certain resolutions recommending action by the several organizations, and that the plan involves a separate building for the Engineers' Club. I do not understand that it is proposed to merge all the different Societies into one, but that the proposal is that the National Societies shall occupy one common building, and the Engineers' Club another. It seems to me that acceptance depends upon the adequacy of the scheme to be devised for the ownership and management of the property to be acquired. The schemes hitherto suggested may be objectionable, but I think one can be devised.

"I believe therefore that an effort should be made in that direction. I am little in sympathy with the feeling that any one Society has a higher professional standing than another. Existing facts and conditions will, however, have to be recognized, and indeed, I believe that those enumerated by you would warrant the American Society of Civil Engineers in taking the lead, even if this involved some pecuniary sacrifices on its part. I am glad to note that the first step recommended is to obtain plans and estimates from Architects for the buildings.

"I believe that the land for the Engineering building should be owned by a separate corporation, whose stock should be taken in such ratios as may be agreed upon by the various societies in interest, in view of their probable use or financial ability. That each society should remain entirely independent in managing its own affairs. That each should occupy so much of the building as it actually needs, with proper regulations as to the alternate use of the larger auditoriums which would be but seldom occupied. That the libraries should be kept separate, but with provision to make the books accessible to members of the other Societies. That each should pay rent upon so much of the building as it uses. That other Engineering Societies should also be admitted by joint consent, and should also pay rent. That provision should be made for the future growth of each Society and consequent changes in the accommodation required. That inasmuch as not all the available space would be needed at first, and as the annual interest and taxes (for I do not believe that the latter could or should be avoided) might aggregate more than the present interest, taxes and rentals incumbent upon all the Societies put together, the

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surplus space should be rented to Engineering tenants acceptable to the Societies. That the profits should be kept small, and that, if any, they should be divided back among the stockholders (the Societies) of the new corporation, which might be managed either by directors elected in the usual way or by trustees appointed by the various societies upon some agreed basis.

"This is but a rough-cast scheme, made on the spur of the moment, and I hope that a better one will be produced."

Mr. Chanute's idea, as you see, involves a much more comprehensive scheme than the one now proposed. He suggests a huge building enterprise in which the American Society of Civil Engineers shall take the lead and enter into a speculation foreign to the purposes for which it is organized, and involving the expenditure of a much greater sum than is now proposed to be placed at its disposal.

Letter from Wm. Metcalf.

Mr. William Metcalf, another Past-President, wrote as follows:

"I am heartily in sympathy with your views as far as they deprecate any move that would jeopardize the independence and the high professional standing of the Am. Soc. Civ. Eng. Would it not be possible, however, to safeguard the standing of the Society and at the same time secure better located and better quarters in a great center of engineering activity?

"The most serious mistake in my mind is the including the Engineers' Club in any way. It seems to me that that feature is ridiculous. As to opposing any arrangement for a general engineering center, that would come with a bad grace from a Past-President of one of the other societies and a Past Vice-President of the third.

"I think you ought to publish your views in *Eng. News* and not let the argument go all one way."

The next of our Past-Presidents, in chronological order, is the distinguished ex-Chief-of-Engineers of the United States Army, Gen. William P. Craighill, whom the Society was glad to honor by admission to its roll of Honorary Members, seven years ago, after eleven years of active participation in the advantages of membership. I have seen a letter from Gen. Craighill opposing the present scheme, and supposed that it would be presented here. In response to my letter, he wrote:

"'I have been away from home and otherwise prevented from writing a suitable letter on the subject of accepting the Carnegie offer, but I am quite willing to be quoted as preferring a separate establishment for the Am. Soc. C. E., just as I think it best for my family to live in its own house and be independent, if possible.'"

Mr. Alphonse Fteley, another Past-President to whom I wrote, preferred to send his communication directly to the Board of Direction. You have heard it read by the Secretary.

Letter from Robert Moore.

Mr. Robert Moore, another and the latest of our Past-Presidents, wrote:

"When Mr. Carnegie's offer was first announced, I had the feeling that so generous and munificent a gift ought to be accepted if we could possibly do so.

"But as I have thought of it since then the probable or even possible gains to the Am. Soc. C. E. by the proposed union have become more and more shadowy whilst the losses have grown in certainty and importance.

"Amongst the gains is a larger and more imposing meeting room and the ability to more readily meet the members of the other engineering societies. The larger meeting room, however, will hardly be needed by us except once a year at the annual meeting and this need can be more cheaply provided for by the use of Carnegie Hall or by an additional story on our present buildings. And to afford opportunity for meeting members of other societies is now the special function of the Engineers' Club and hardly anything else seems to be called for.

"On the other hand, by the plan proposed, the Am. Soc. C. E. will be obliged to give up its present home, over which its control is absolute, and take other quarters in which it will have only a one-fifth interest and in which its movements will always be subject to complication and control by others whose views and interests will not be the same as ours and may be adverse.

"The merger of the libraries of the different societies which has been suggested is, as I think, distinctly undesirable. On this point we in St. Louis have had a good deal of experience. The Engineers' Club which started out with its own library made, some years ago, an arrangement with the Public Library by which the latter, in consideration of the payment of a large part of the annual dues of the Engineers' Club, and the placing of its books in the Public Library, agreed to furnish to the Club a meeting room and buy such engineering books and periodicals as the Club might designate. After a number of years' trial the arrangement proved unsatisfactory and the Club withdrew from it, but without being able to withdraw its own library. A similar arrangement was then made with the Mercantile Library. But after a few years' experience this too proved a failure, and the Club withdrew to quarters of its own and began again the formation of its own library, which it is not likely ever again to give up. The Medical Society and the Academy of Science of St. Louis have had experiences which, though not identical with that of the Engineers' Club, teach the same lesson, viz.: that the small special library fills a place that can be filled by nothing else.

"In the same way I think that anything looking to a merger of the different engineering societies would be a serious if not fatal mistake. The fact that these younger societies have been organized indicates that there is a sufficient reason for their separate existence which any sort of organic union would defeat. But unless there can be an organic union the proposed union building will tend to promote dissension rather than harmony. It is a matter of universal experience that between different families harmonious relations are best promoted and maintained by not living under the same roof.

"From the standpoint of the Am. Soc. of Civil Engineers, therefore, I can see no advantages which will compensate for the loss of our own home and our complete autonomy."

Letter from Mr. Moore.

In a letter just received from Mr. Moore, which the President has handed to me for use in this connection, he says under date of June 7th:

"Though disposed to find reasons for accepting Mr. Carnegie's generous offer, I have been unable to do so.

"We are in such a good condition now that we have much to lose. If the several societies were united in one great organization I should

Discussion on Joint Engineering Building (continued).

say at once that the new building was just what we want. But such a Union of the societies is impossible and on the whole, I think, undesirable.

"But without an organic union the proposed housing in one building not owned by either will I think be an entanging alliance that will produce friction and discord and not harmony. It is the sort of experiment which with different families is almost sure to be disastrous."

I also wrote to Mr. John Bogart and Mr. Francis Collingwood, Past Secretaries. Mr. Bogart has replied by telegram to me here advising careful consideration of the questions by the Board of Direction and ts submission to a letter-ballot of the Society.

Letter from F. Collingwood.

Mr. Collingwood wrote:

"At first thought the prospect of a magnificent building devoted to the uses of the several Engineering Societies is very captivating.

"I can see, however, that in the case of our Society it *might* be obtained at too high a price, even though there is no actual outgo.

"There is much in the absolute quiet and restfulness of the present building which could hardly be maintained in the one proposed.

"The merging of the libraries, while enlarging the scope, might not prove an unmixed blessing.

"The several Societies being placed on a par, in so far as the ownership and occupation of the building are concerned, certainly would have a tendency to lower, in the eyes of the community, the standing of the Society as regards the professional qualifications required in members.

"The one thing that seems attractive in the scheme is the provision of a meeting room large enough for all occasions. Our own room is already too small at times of Annual Meetings. For everything else there is room enough where we are for some time to come.

"Large caravansaries are never favorable to study and useful thought; and I think we should know fully the complete details of the new scheme and be able to study it in all its bearings before coming to a conclusion."

I also wrote to the living Past Vice-Presidents of the Society who had not already publicly expressed their opinions, and received replies as follows:

Letter from Joseph P. Davis.

Mr. Joseph P. Davis, one of our most honored members, noted for the judicial quality of his mind, wrote thus:

"In my opinion it would be a fatal mistake for the Am. Soc. C. E. to enter into any partnership with other Societies for joint ownership of a building.

"I cannot imagine that the thought of doing so will be entertained by any large number of its members.

"We do not wish to be submerged. Your arguments against such action are sound."

Letter from Chas. Hermany.

Mr. Charles Hermany, an old and honored Past Vice-President, wrote thus:

"Your letter contains the first correct information I have received upon the subject. By this I do not imply that that which has been already printed is incorrect, but I must be permitted to consider that some of it has been premature, if not irrelevant; in fact, the oracles seem in some cases to have left their temples, and upon the hustings and in the daily press have tendered their auguries with a freedom and profusion which fails of admiration. Someone should call these divinities back to their temples on Broadway and to those in other marts of our country.

"The commercialism which has in recent years dominated to some extent the engineering profession in its various activities has heretofore, and does now, threaten the survival of the professional engineer, pure and simple; and while this present movement, following closely upon the after-dinner speech of Mr. Scott, may not be a stroke of radical commercialism aimed at what to men of your and my experience is professional character, it is, nevertheless, for the time being, to be parried as such.

"My present inclination is to let the matter rest, with a grateful acknowledgment to Mr. Carnegie for his offer, which was undoubtedly prompted by the best of motives; at the same time, such a course would be a conservatism, the wisdom of which would be questioned by many, especially the younger members of our society. It behooves us, therefore, to consider the matter carefully, and I do not know but what it might be wise to have the question discussed at the Asheville convention. Moreover, we should always bear in mind the valuable contributions to practical engineering literature that have come out of almost pure commercialism in engineering.

"Inasmuch as we have had less than two weeks' time to consider this movement publicly, and because of my other engagements, I am not fully informed nor prepared to write more definitely upon the subject. In brief, I consider the movement in character similar to those made heretofore, but one of infinitely greater potentiality, and one that we cannot consider as a trivial event. It would take the prescience of a seer to perceive and express all that seems to me involved in this present movement."

That sums up this question of commercialism in professional engineering. The commercial element is very strong in some of the societies to which it is proposed to give a union building. They are technical societies, it is true, but there are many members who are inventors and manufacturers and dealers in commercial articles who do not take the professional view that the civil engineer does, and cannot take it. Now, at our conventions and at all of our meetings we have carefully excluded anything in the way of commercialism. We do not allow in the *Transactions* papers especially advocating personal interests. We do not allow, at our conventions or meetings, inventors or manufacturers to exploit their wares and solicit custom.

That is done at the American Water Works Association, which is very similar, in some respects, to the other societies, and I do not know why Mr. Carnegie did not include that in his gift, unless there were no members of the Engineers' Club present at that time who were members of the American Water Works Association; but we have always excluded that, and we do not want to have an intimate association with that class of society, nor do we want to have rooms provided in the building for the display of commercial products. We do not want to have the prevailing sentiment in that building such as exists in the Engineers' Club, and concerning which

Discussion on Joint Engineering Building (continued).

a prominent member of our Society, and a member of the Engineers' Club, and the Chief Engineer of a large enterprise, told me a few days ago that he had been a member of that club for some time, but he did not go there now because he wanted to get away from business when he went to a club; that he wanted to enjoy himself, and if he went into the Engineers' Club he had somebody running at him and trying to sell stop-cocks, or rails, or bolts, all the time, and that is the condition that it would get into, and you cannot get away from it.

Mr. Carnegie does not give this thing to one or two or three or four; he gives it to the five for a union building for them all, and they cannot divide that building under that deed. It is preposterous to suppose that under that deed the building can be kept entirely separate, when it is a Union building which is to be erected, so that the proposition made by Mr. Carnegie now is not one which the American Society of Civil Engineers can accept in any way; and that proposition is addressed to us personally and not collectively—by personally, I mean to the Society alone, to the American Society of Civil Engineers.

Now, this Society, it seems to me, must and ought to address to Mr. Carnegie a respectful letter stating that they acknowledge his gift with thanks for the kind feeling expressed, but that the whole sentiment and reason for being of the American Society of Civil Engineers forbids it to be associated on the same terms with a purely commercial and social organization. It would be up to Mr. Carnegie then to say what he wanted to do, and I have no doubt at all that Mr. Carnegie would see it, because he is a good business man himself, and he has associated a great deal with professional men, and he knows professional feeling; but he would see, if that was put before him, and brought before him in that way, that we were right and that he had been misled in this offer. The offer as it stands now, however, is not one which the American Society of Civil Engineers can possibly accept at all until the terms of the gift are changed.

Letter from Samuel Whinery.

Mr. Samuel Whinery, who was Vice-President in 1893, writes as follows:

"In the first place, the whole scheme is yet too vague to enable anyone to form an intelligent opinion upon the subject. We need to know in considerable detail the plan it is proposed to carry out. Particularly is it necessary to know what responsibilities the Society is expected to assume, and what liabilities it will incur by joining in the project. While we may indulge in some sentiment upon the subject, it must be considered primarily as a business transaction and upon its merits. The Am. Soc. C. E. has heretofore followed a wise and conservative policy which has resulted in a large degree of business prosperity. It cannot now afford to change that policy, in order to accept this magnificent offer of Mr. Carnegie. It must consider the matter deliberately and fully, and this will require no little time even after all the necessary data are in hand.

"The idea of the project is attractive and it seems reasonably certain that our Society would be benefited in a number of ways if it could be carried out satisfactorily. On the other hand, it is certain that the plan will be in many respects disadvantageous to the Am. Soc. C. E., however beneficial it may be to the other Societies. It is not possible for me, with my present information, to strike a balance or to determine on which side of the account it will be.

"As a general proposition I am inclined to favor the project. Furthermore, I think that our Society should be willing to make some sacrifice in the interest of her sister societies, provided the sacrifice be not too great.

"I should strongly oppose anything like an organic or even working union of the societies. I would make it a cardinal requirement that our Society must maintain its separate and independent existence just as it does now. The relation of the several societies would then be simply that of joint tenants of the proposed building. I do not see how such a relationship could seriously affect the character and standing of the Am. Soc. C. E. or lower its standards and dignity. We would continue to be the same society under the same management as now, but the location of our headquarters would be changed, and we would have in the new location certain increased facilities, such as a commodious hall for large meetings, and a good restaurant close at hand from which refreshments could be served, and where members could conveniently get good meals.

"With the stipulation named above—complete independence of organization and management—the question to be discussed is, as I said above, one simply of business and expediency.

"What will be the cost of interest and maintenance?

"What disposition can be made of our present house?

"If sold, how, and upon what terms can the proceeds be invested?

"To what extent will the Society incur actual and contingent liabilities?

"Will the new location be better or poorer than the present one?

"Will the advantage of a joint building and the facilities it will offer, overbalance the disadvantages of the change?

"These are to my mind the important questions to be considered; and they cannot be intelligently considered in the present embryotic state of the scheme. What we need now is a definite detailed project of the proposed enterprise, upon which to base opinions."

The writer of this letter is clearly not in haste to accept the gift and postpone scrutiny of its details.

I do not wish to tire you or detain you. There are not many other letters, except these. We have been told that the sentiment of the East was unanimously in favor of this proposition.

Letter from S. M. Gray.

Mr. Samuel M. Gray, of Providence, is a Past Vice-President of the Society, and he writes:

"I feel indebted to you for favoring me with so clear and impartial a view of the proposed 'merger' project.

"Certainly, all must appreciate and applaud the noble, disinterested, and philanthropic spirit which has prompted Mr. Carnegie to make his munificent offer; and it must assuredly give to the societies needing and meriting assistance, a newness of life; fresh encouragement in the fulfillment of the objects and purposes for which they were organized, and that they have been able but partially, perhaps feebly, hitherto, to attain.

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"But while this may be true, and doubtless is, regarding one or more, perhaps all, of the other organizations you mention as beneficiaries in the scheme proposed, it cannot be said to be so of the American Society of Civil Engineers, and I desire to say that I believe the American Society has but little, if anything, to gain and much to lose by favoring the 'merger' proposition."

Letter from Chas. Macdonald.

Mr. Charles Macdonald, a Past Vice-President, says:

"I have read your letter with a great deal of interest and have given it the most careful consideration.

"Let me say, in the first place, that I consider you have not only presented a 'fair statement of the case,' but an admirably clear and logical description of the relations which exist, at the present time, between the organizations referred to. Nevertheless, I am compelled to urge upon you the importance of wisely and patiently investigating the possibilities of the future development of the profession, before committing yourself to the belief that the American Society of Civil Engineers will always hold first place. For my own part, I have never held to the belief that the Engineer required any qualifying adjective to designate his rank. In the earlier stages of development, it is true that the necessity seemed to exist for a proper distinction between the designer and constructor of Engineering work and the skilled mechanic who could operate it, and as such Engineering work was in general carried out on commercial lines, it was natural that the constructor should be called a Civil Engineer, as distinguished from a Military Engineer, or from the mere mechanic, who operated the work, after construction; but in the process of time, it has become evident that the differentiation of activities grouping themselves under the general head of Engineering, cannot be for long restrained, under any designation which does not permit of the most comprehensive title, for the man who utilizes the forces of Nature for the benefit of his fellow men. Up to within a century, we have been utilizing forces of Nature, which were of comparatively simple application, but with the invention of the steam-engine a new line of activity presented itself and now the Mechanical Engineer has acquired a right to the use of a qualifying adjective, so long as such distinction is considered necessary. Later came the utilization of electric energy, of which we are as yet but upon the threshold. Judging, however, by the tremendous strides made of late, who shall say what the future of that branch of the profession shall be and whether the infant society of to-day shall not over-shadow all the other societies, in the near future?

"I, for one, do not feel like taking the risk of waking up some day and finding the dear old A. S. of C. E., which you and I have helped to build up, forced into the background of Engineering progress, by a child of to-day, but a child endowed with all the power and potency of illimitable growth, and the sooner we recognize it the better. Now, you will naturally say, what scheme have you to suggest, whereby this offer of Mr. Carnegie can be turned to the best account. This is not an easy question to answer and I have not had time yet to consider all the reasons *pro* and *con* involved, but I can see in my mind's eye, deeply engraven in stone, over the capacious entrance to the building which is to be, the superscription,

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and I am firmly convinced that the leading men of our several organizations will be able to work out a plan under which each may maintain its individuality in this temple of applied science, and yet all will work together, for the general good of the profession, which we love so well."

Now, the difficulty about Mr. Macdonald is that he does not understand, or he has not got the meaning of civil engineering. It is not engineering with an adjective. It is as the Germans write it; it is "Civil-engineering," all one word, and "Civilengineering" is what Thomas Tredgold said, in his well-known definition, is the art of directing the great sources of power in Nature for the use and convenience of man. Now, that includes all the branches of engineering, and the term "Civil Engineering" is not, and is not generally understood to be, applicable to any one branch of the profession of civil engineering. The tendency is, I know, among certain classes, among men who are not members of this Society, to say that the civil engineer is simply a man who does not belong to one of the other special societies; that is, he is not a mechanical engineer, or an electrical engineer, or a mining engineer, when he is a civil engineer. That is entirely incorrect, and the general impression, the general sentiment of the profession is not as thus expressed. I don't know what would happen after the development of the electrical engineers, but I think Mr. Macdonald looks forward to the day when the American Society of Civil Engineers will be "dissolved into a multitude of revolving electrodes," which Sir William Crookes thinks will be the fate of all matter.

To show you that the sentiment of the Society is not so universally in favor of this movement, I will read a letter from a Past Vice-President of the Society, in the State of New York, Mr. Robert Cartwright, of Rochester. He writes:

Letter from R. Cartwright.

"I am heartily in accord with your views in the matter. As a Society in this country, we are the only one that I have any knowledge of, that insists on maintaining a standard by which to regulate the acceptance of its members as being qualified for such position. To preserve that standard intact has always been my aim in my official connection, so that its status should be maintained among the best organizations in Europe or elsewhere. To be affiliated with the A. S. C. E., it is not enough that a man should be a good fellow, as is the case in some societies, but that by his professional experience and his integrity, he should be found worthy by his professional brethren and be honored by being elected to membership in the Society, based upon a standard or rating as required by the A. S. C. E.

"I honor Mr. Carnegie for his disinterested generosity in his efforts to benefit his fellow men, and can see how self-appointed, interested parties might make an appeal to his better nature that would impress him favorably, but I cannot endorse a project that embraces all kinds and conditions of societies, whose only claim to recognition is a body organized under some scientific appellation, and whose members are absorbed without any regard to a standard of merit. As you justly say there are many men in such societies who are the peers of any in the A. S. C. E., in capacity, in integrity, or in financial standing, but so long as they are not selected on a basis as high as that required by us, it certainly would not be equitable that we should go into partnership

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with them. The Engineers' Club is purely a Social Club and I can't see that they should become participants in Mr. Carnegie's generous plan. Our A. S. C. E. is an organization that is recognized by the whole civilized world as a power. We have our library and our property and are self-supporting, and it does not strike me favorably that we should lower our standard of qualifications and throw all this into a common fund to be participated in by all societies, however ephemeral or social or scientific, that may from time to time come into existence. Our Society is made up of material from all branches of the engineering profession as evidenced by our Constitution in Article II, Section 2, and is certainly broad enough to take in any person possessing the necessary qualifications. We are either something or nothing, and I should emphatically oppose our being merged into a conglomerate mass that is made up of any and everything, named by the promoters for the purpose of being fostered and supported by the large-minded, generous Andrew Carnegie. I honor him intensely and I believe were the thing properly presented to him, he would so perfect the scope of his donation that its future would be a great one, calculated to improve the profession and still retain the exclusiveness pertaining to ability and integrity. When his beneficence absorbs social clubs, *et al.*, it certainly would not confer any honor to become a participant.

"I regret my inability to attend the Asheville meeting in order to participate in a discussion of this subject, but I think that the sober common sense of the A. S. C. E. will result in a just solution of the question."

After writing that letter, Mr. Cartwright thought it would be a good thing to see what the Rochester contingent of the American Society of Civil Engineers thought of it, and they all signed it.

"We heartily concur in the foregoing."

" Justus Herbert Grant, M. Am. Soc. C. E.
" William E. Hoyt, " " " " "
" J. Nelson Tubbs, " " " " "
" John F. Alden, " " " " "
" W. N. Radenhurst, " " " " "
" Geo. W. Rafter, " " " " "
" Le Grand Brown, " " " " "
" J. Y. McClintock, " " " " "
" E. A. Fisher, " " " " "

Letter from P. A. Peterson.

Mr. P. A. Peterson, of Montreal, another Past Vice-President, writes:

"In regard to the amalgamation of the various bodies of Engineers and others of the City of New York, consequent upon the offer by Mr. Carnegie of a million dollars to put up a Union building, I am very much opposed to such an amalgamation as I can not see what the Am. Soc. C. E. is to gain by it, and I can see very much what we shall lose—viz., the management of our affairs, and the prestige which we have gained which should be enough to keep us out of any scheme of Union unless the terms are very different from what I suppose them to be."

Letter from G. H. Benzenberg.

Mr. George H. Benzenberg, Past Vice-President, writes thus:

"I do not yet fully understand to what degree these Societies are to unite to carry out the proposed merging of their property interests, and whether the affiliation is to be of such a nature as to partially obliterate their characteristic individuality.

"Should the scheme contemplate this latter proposition, in other words, remove the restrictive requirements of this Society, I should think that not any of its members would consider such a scheme seriously. If it is proposed that each of the five associations shall contribute one-fifth towards the purchase of the real estate necessary for the building, it seems to me the burden might become too great for some of them to assume, while, if the property is to be paid for upon any other basis, the tax might become too great for the others, besides which the unequal interests thus created may in time, with the more rapid growth of one or the other, become unsatisfactory. These matters must all be considered so as to guarantee such an alliance to be as satisfactory to all parties concerned in the future as well as at the present time, as the partnership cannot hereafter be dissolved without sacrifice to one or the other party.

"No definite action towards entering this combination should therefore be taken by this Society until it is definitely established upon what basis it is to unite with the other Societies, what obligations it is to assume and how its interests, if acquired, are to be protected and administered. Every member has a personal interest in this question and should be permitted to voice his conclusions after having been fully advised as to the proposition and the obligations assumed.

"It is quite natural that a difference of opinion should arise among the different societies regarding this matter as well as among the members of our own Society, notwithstanding each has the best interests of the Society in mind and is entirely sincere and unselfish while formulating such opinion.

"The whole subject at present is undoubtedly surrounded by a great deal of pardonable sentiment, but before long it must naturally resolve itself into a simple business proposition, and in order that the alliance, if contracted, may always, individually or mutually, be fair, comprehensive, agreeable and beneficial as well as permanent, it is necessary that it be given unprejudiced and deliberate consideration before any entangling obligations are assumed by any of the parties.

"The question cannot justly be disposed of as if there were nothing at stake aside from participating in a most generous contribution. Joint financial interests are not always conducive to maintaining the most pleasant or friendly relations, unless they are previously well defined and determined.

"It seems to me the most vital question is not as to what convenience may be secured to the Societies and their members through the munificence of a generous admirer of the engineering profession, but what can be done to permanently advance the interests, standing and recognition which is due to it.

"Careful, deliberate and exhaustive investigation previous to arriving at conclusions is the safeguard of successful Engineering. I would suggest that this principle be applied here as well, as there is certainly no haste required in this matter. If it is a good thing it will keep."

Letter from Rudolph Hering.

The last letter to which I will ask your attention is from Mr. Rudolph Hering, a Past Vice-President. He writes:

"The acceptance of the generous gift of Mr. Carnegie, as I stated, is no more degrading to our Society than a similar gift to Universities

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and other institutions of learning. I think it is hardly fair to say that our 'Society is not an educational institution, but an association of men who have acquired such an education.' What is the purpose of a library except for spreading knowledge and learning, and why do we read papers at our meetings and publish them, except to instruct our fellow members regarding our own research or experiences? I confess that I have never attended a meeting without learning concerning some engineering work, and whenever this education among our members should cease, our Society, it seems to me, would become a mere social club. Although such a club is excellent in itself and for its special purpose, I trust that to adopt its functional character will never become the policy of our professional Society, which has for its main object 'the advancement of engineering knowledge.'

"The second point of your letter is the statement that it is inconsistent for our Society to be associated in the same building with other organizations having a lower standard of membership. I fail to see that it is in any way harmful to a member of any branch of the profession to associate with others who are either younger, less experienced or less well informed in our own special line of work than we are ourselves. He whose mind is open to advancement will find instruction from every progressive and freely developing mind, even though younger and less experienced. You write that the general public will assume that persons so associated in the same building must necessarily all stand on the same professional plane. I think this will be no more the case than the assumption that the members of any single one of our societies all stand on the same plane, although enrolled in different classes of membership.

"Very few engineers who do not wish and expect to be improved in some ways by their new associations ever join a professional society; all but very few will advance by the new intercourse. If the American Society of Civil Engineers maintains the highest grade of membership, I think a closer association with other societies would have the effect rather of gradually drawing the grades of others upwards than ours downwards. Since the birth of our own, the oldest of the societies, this gradual upward tendency has been quite apparent in its successive constitutions, and the highest limit I hope has not yet been reached. The other societies will no doubt develop the same tendency and, consistent with the more rapid recent progress in engineering, they may develop even more rapidly than we did when younger.

"The proposed union is limited practically to the housing and to the material and social interests. It is not to be extended to the professional interests and professional work. Therefore, I do not see any fundamental difficulty in gathering the several branches of engineering under one roof and yet preserve the fundamental characters of the respective constitutions.

"The only difficulty, I believe, lies in the business aspects of equitably dividing and arranging the respective properties and of their management. Mr. Carnegie proposes to divide his donation equally among the societies, which would have the effect of increasing the present property of each one by a definite sum. The American Society of Civil Engineers being at present the largest and wealthiest of the several societies, could by adding from its own funds have the largest quarters and any special conveniences which it desires and for which it can pay. It would own for itself just what it puts into the new and common property. The libraries and much of the other present properties could remain as now with each society. The auditorium common to all the societies could be made larger, handsomer and more suitable than is possible if each society had a separate house. It would be used more frequently, be the gathering place of all visiting engineers and become a temple of American engineering.

"So far, I see no reason why suitable committees could not arrange the business end of such a joint occupation, in order to secure a fair, just and satisfactory system of housing the societies under a single roof, preserving to each one their present full independence wherever this is necessary and proper. Nor do I see any reason why a governing body, elected in proportion to the membership, would not properly represent the societies separately and as a whole, and properly manage those interests which are common.

"I do see a good reason, however, for drawing a distinct line between the professional societies and the social club. I understand it is the intention of having for the latter an entirely separate building, although adjoining, and this arrangement should obviate the criticism of a close union with, as you say, 'an unprofessional, social and commercial organization.'

"For one, I would be willing to trust representative committees of each society to make a careful investigation of the subject in all its bearings, and after a full discussion between such committees, and after all aspects are presented to the members of all the societies, I should also trust a ballot to decide the proper policy."

It is to be regretted that in commenting on the propositions submitted, Mr. Hering should have based his remarks largely upon sentences which he has quoted only in part, and which, therefore, convey a very different meaning from the complete sentence.

As regards education, we all agree that, in a certain sense, all conversation and intercourse between men is educational, but a society like ours cannot, in my opinion, be properly termed an "Educational Institution." That term I understand to be applied to an institution in which regular courses of study are pursued under the direction of persons skilled in particular branches of learning and possessing the faculty of imparting information to students, and examining them to find out how much they have absorbed. I do not consider the term applicable to an association of experts in co-ordinate branches of science for the purpose of exchanging their ideas and experiences. The members of such an association do not "sit at the feet of Gamaliel" and accept the law as he lays it down, but they have Gamaliel down on the floor with them and question and criticise his dicta, and probably teach him as much as he teaches them.

As for elevating the tone of other societies by simply having them under the same roof, I fail to see how this can be accomplished.

As to the proposition that the technical societies should be kept entirely separate and apart from the social and commercial element, the only reply is that the gift is for a union building, and the promoters of the scheme, in speaking of the advantages of the location, speak of its fronting on Fortieth Street and Bryant Park. That is the front door of the Engineers' Club. To get to the Engi-

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neers' building you have got to go through the back door of the Engineers' Club, as proposed.

I do not know that I have any definite proposition to make on the subject, but I do think that the proper method would be, as I have indicated, for the Society to write a respectful letter to Mr. Carnegie stating that we appreciate his gift, but that the conditions attached to the gift are such that the Society cannot consistently with its professional standing accept it. (Applause.)

Oberlin Smith, M. Am. Soc. C. E.—Mr. President, Ladies and Gentlemen: We have heard some strong testimony from Mr. Croes and the people he did write to. I want to ask him if he can give us the opinions of a lot of the fellows he did not write to?

As I happen to be a member of all five of these organizations, I feel as if I might be able to look at the matter impartially, and as though I could see the difficulties that surround this question from various standpoints.

I do not pretend to say that we want to jump right into the arms of the present committee and Mr. Carnegie, and swallow the whole thing just as it is. It is a subject that requires consideration, but I want to answer, as briefly as I can, three or four things that have been said to-day. I think there is too much tendency in this Society—I have heard it as a rumor, and I begin to feel this afternoon as if there might be some truth in it—to think we are "It"—to use a slang expression—and that if all the members of the other societies who are engineers practicing their various vocations would only disorganize and become members of this Society, this would be the great Society, and all would be right. If that could be done I would gladly help. I do not know what the proper name would be. The name suggested by Mr. Macdonald, "The Institute of Engineers," would be in good taste, but I do not hope to live long enough to see it. I hope somebody in another generation will see one organized in that way, with all the smaller societies forming chapters of a greater body, but we can hardly hope for that now.

The great pity is that this plan proposes to face the building on two streets and not on Fifth Avenue. We ought to have a large building, of beautiful architecture, bounded by streets on two or three sides of it at least, but we cannot get that now. The only question is the practical one, shall we take this magnificent gift for our Society, or will we consider that the entire independence which the Society now has may counterbalance that two hundred thousand or a quarter of a million which would be our share. If so, well and good; but there are other reasons why we cannot afford to let this gift go, and give it up to the other societies.

I think there is a mistaken opinion among a good many of the members of this Society who do not happen to belong to the other societies and do not go to their meetings, about the character of the other societies. It is not true that they are places where goods are bought and sold, like some of the Railroad Associations. At the Mechanical Engineers', the Electrical Engineers' or the Mining Engineers' Societies there is nothing of that kind. I know the character of the papers which are presented and the discussions thereon, as well as the character of the members in the Mechanical Engineers, and it is as high as in the Civil Engineers. There is as much science and as much intellect as there is here. They are men of the world and they stand as high socially. In the Electrical Engineers they are men who carry on special work requiring much learning. The Mining Engineers, unfortunately, have some members who are not scientific men, but those who are do not go there for commercial purposes, and they are men of high grade, good training and high talent for engineering.

I want it thoroughly understood that if we are all going in together it is not a case of one society taking in all the little beggars to nurse them and care for them; it is not a question of "leavening the lump" as has been said. We do not want the feeling to grow that they are affiliating with this great and grand old Society. It is nothing of the kind. It is the feeling that has been with many of us for many years throughout the engineering profession in this country, and not only in the profession itself but in the eyes of the whole engineering world. We should overlook our petty jealousies and work together more, and get that harmony of action and more intimate acquaintance with each other which we need to come nearer together,—and, after all, I regard this whole matter as simply geographical. It is bad for people in a similar business to be too much separated. You cannot do the stock business of New York City in four or five stock exchanges miles apart, and so it is in all trades and businesses. Concentration is the modern thing. Bring people together where they will see each other and where they may work with each other and work together. Therefore we want the societies near together. If they were in four separate buildings connected with tunnels under the street, that might be an ideal thing. If not, then have one building and have it situated and arranged in such a way that we are not treading on each other's toes, having our own privacy, but yet being near together. It is not a merging of societies. It is merely a question of policy and expediency, and a matter of bringing us together where we may get and do more good to each other.

A man may now bring a friend from the West to New York, and he may have but a little time at his disposal. Perhaps he goes into the Engineers' Club—and by the way, I have a great respect for this Club, notwithstanding the statement that the high-balls which they have there are driving all the juniors to an early grave—but he should be able to call in at the Society Houses also, without traveling all over

Discussion on Joint Engineering Building (continued).

town. I must say that I am sorry the thing has taken the shape that it has here. I know most of the men who have gotten the thing started—Mr. Scott and the others—and I think that they deserve a great deal of credit for doing what they have done. There is no secret conclave; there is to be a big committee appointed for all the societies, and all interests will be watched carefully. That Committee must be trusted to do what is right.

Mr. Carnegie knows that the club is not a technical society, but a purely social club, though containing many engineers. If he chooses to give it a present, let its building be owned by itself. The other building, anyhow, merely abuts on the Engineers' Club. Let the four societies come together as has been so often proposed, and the fact that the Engineers' Club is close to them will be a great advantage.

A man comes to New York, a stranger, and goes to a hotel; he is in a hurry, and he wants to meet engineers, and he inquires where the engineering people can be found. He is told that the Electrical Engineers are down town, the Civil Engineers are a mile up the street, and he says, "57th Street; that is too far; I haven't time to go there. Where can I meet so and so?"

It has been said that this Society will get only one-quarter or one-fifth of the property. That is not so, because we will get a share of an enormous hall, perhaps more than our exact proportion (laughter). The reason the Mechanical Engineers have to go out and hire hotels is because they cannot use their own rooms. Their hall is not big enough. Let us have a hall that is big enough for anybody and for any kind of an engineering meeting. It can be let out to the Association for the Advancement of Science and other big societies here and from abroad. It will be a place where all Science can have its headquarters. Let us have it big enough. There may not be another chance.

This Society should not take too much credit because it happened to be born first, but it had better look out not to get in the back seats by too much delay.

Now, about other societies coming in and backing out afterward, not paying the interest on their share of the loaned money, there could be arrangements made, I think, to force them to give up their holding. If they are bankrupts they cannot stay there, and we do not want them. Why can't they go out and leave the property to the rest of us?

I think that we ought to look at this whole thing from a larger standpoint than any of us have done yet. What would be the effect on the engineers of this country, and upon engineers in Europe and all over the world, if this Society holds itself so close that it cannot come in with the other societies? Those societies are great, growing and enterprising, and so recognized all over the world. They come together and accept this magnificent gift and run the thing, and it increases and becomes famous, as it will, and this American Society of Civil Engineers cannot afford to be left out.

I therefore am in favor of this resolution except that I wish to offer an amendment to it. I do not remember the exact wording. Mr. Hunt will doubtless supply me with the clause, the portion where it says that the Board of Direction shall be instructed to examine into the feasibility, etc., and then issue a letter-ballot. What is the exact wording?

The Secretary.—Perhaps I had better read it over.

(Resolutions read. See p. 226.)

Mr. Smith.—To that last resolution but one, where it says "Resolved, that they send a letter-ballot," I offer, in amendment, to insert the words "within sixty days." If that is not proper we can make it more, but what we have to fear in this matter is that the thing will be delayed—hung up, so to speak—and go on for months and months. The other societies have acted promptly, in good spirit. Mr. Carnegie is a man of business, and wants to do business, and do it quickly. We don't want to linger. We should send out this letter-ballot and find out what the Society wants. The members of this Society must rule, and we can thus find out, and soon.

The Secretary.—The Board offers the resolution to the Society for adoption.

Mr. Smith.—I offer that amendment.

The President.—The question before the house is on the adoption of the resolution reported by the Board.

H. S. **Haines**, M. Am. Soc. C. E.—If I may be pardoned for inserting one word to facilitate this thing, I suggest that this gentleman's amendment be received and laid upon the table and taken up at an advanced stage of this discussion. We have gotten along in the afternoon and we have endeavored to concentrate our attention on the remarks of the gentlemen who have prepared themselves fully to give us information *pro* and *con*, and I, for my part, do not feel that I am physically able to act intelligently if this thing is brought to a vote now, and if we begin to take up one amendment after another and discuss it for what it may be worth, good or bad, it will be a long time before we get to the subject which is germane to the whole discussion, and that is the resolution which the Board of Direction has offered to us for our action. At last, that is the thing we are going to get to, and that is the thing we are going to discuss. When that time comes I hope to have the opportunity to express some views on the subject myself, and when I do, I want to ask that they may have as careful consideration as you have given to the remarks of the gentlemen you have already heard; therefore, I hope that the gentleman will

Discussion on Joint Engineering Building (continued).

not understand that I am endeavoring to prejudice his argument, but I ask that it be received and laid on the table to be brought up at a later part of the discussion.

Mr. Smith.—If this discussion is to go on through the Convention I should gladly have it delayed, but I don't want to have it laid over until some other convention. If we may continue the discussion to-morrow or at some other time, that will be satisfactory.

Mr. Haines.—I hope the gentleman does not think that I want to interrupt him, but if that amendment can be laid on the table to be brought up at a later stage of the discussion, he can go on to the other branches of the argument without prejudice to it.

The President.—Mr. Smith has the floor. Does Mr. Smith yield to a motion to lay the subject on the table?

Mr. Smith. – The whole subject?

Mr. Croes.—The motion is, I believe, that it be laid on the table. I don't think that is at all necessary. I think this is the most important subject that will come before us, and we had better simply adjourn this meeting until, say, half-past nine or ten o'clock to-morrow morning.

Mr. Haines.—I do not propose to lay the resolution of the Board on the table. I propose that the gentleman's amendment to those resolutions should just be laid on the table temporarily, to be brought up at an advanced stage of the discussion, that is all.

Mr. Croes.—That will be better accomplished—a motion to adjourn is always in order—and it will be most effectually accomplished by adjourning now to some named hour to-morrow.

The President.—The Chair is under the impression that the amendment of Mr. Smith is not seconded, and the question is upon the resolutions offered by the Board.

Mr. Seaman. – I would move, Mr. Chairman, that we adjourn until to-morrow morning at 10 o'clock.

Mr. Smith.—I second the motion.

The Secretary.—Will you allow the Secretary to say one word? It will be a physical impossibility to hold two meetings at the same time, I think; and the programme, which has been very carefully laid out by the Committee in charge of this Convention, provides very fully for all of the time during the Convention, except the meeting for Friday morning which is the last day of the Convention.

Mr. Smith.—I believe the question is on the motion to adjourn.

Mr. Catt.—May I say just one word? I move to amend the motion to adjourn to to-morrow at nine o'clock, at which time this question may be taken up and discussed for one hour. The motion to adjourn to a fixed time is capable of amendment.

The motion was seconded.

Mr. Seaman.—I do not think any business that will come before this Convention compares with this in importance, and I think that if to-morrow morning's business is postponed until Friday morning, it will be just as well as to have it to-morrow morning, and if to-morrow we do not have time to discuss it fully, eliminate it altogether, and we should adjourn until ten o'clock to-morrow, and then, if necessary, continue it. I would move that we adjourn until ten o'clock to-morrow morning.

THE PRESIDENT.—The Chair will entertain a motion to adjourn; the motion is not debatable or amendable.

MR. SEAMAN.—I don't know who made the original motion to adjourn.

MR. CATT.—I simply want to call your attention to the fact that a motion to adjourn to a fixed time is a debatable motion.

THE PRESIDENT.—The motion before the meeting, the Chair believes, is a motion to adjourn without fixed time, and it was seconded. Such a motion has to be put to vote without debate. The Chair will put the motion.

MR. SEAMAN.—I do not see why we should restrict ourselves. The only objection to this whole procedure is trying to limit the discussion on this subject. There is nothing that can come before this Society at this time that compares in importance with a full and free discussion of this subject. If we adjourn until to-morrow at 10 o'clock, we can then adjourn at 11 o'clock if we are through with the work.

THE PRESIDENT.—It is quite within the power of the meeting to vote down the motion to adjourn.

MR. CATT.—I would like to change my motion to amend, if Mr. Seaman will permit, to call the meeting earlier to-morrow morning and leave open the question of how long we will discuss this question. Make it 9 o'clock instead of 10. I would like to see him do that.

THE PRESIDENT.—Does Mr. Seaman accept the motion to adjourn until to-morrow at 9 o'clock?

MR. SEAMAN.—Yes.

THE PRESIDENT.—Those in favor of adjourning until 9 o'clock to-morrow for the resumption of the discussion of the matter will please say aye.

The motion was carried.

(At 5.50 P. M., adjourned to Wednesday, June 10th, 1903, at 9 A. M.)

BUSINESS MEETING—(Continued).

Wednesday, June 10th, 1903.

Meeting called to order.

The meeting was called to order at 9.45 A. M., President Alfred Noble in the chair; Chas. Warren Hunt, Secretary.

THE PRESIDENT.—This meeting is held pursuant to adjournment yesterday to continue the discussion of the proposition for a union

Discussion on Joint Engineering Building (continued).

engineering building. Mr. Oberlin Smith had the floor when the meeting adjourned.

MR. SMITH.—Mr. President, I will withdraw the amendment that I offered to the Board's resolutions in regard to a time limit. On further thought, there is little question but what, if the Board has the matter in charge, they will do right. I believe they appreciate the importance of the matter. Whatever may be the opinions *pro* and *con*, there are arguments on both sides about this Society affiliating with the others that can be decided only by the membership at large. It cannot be decided by this small Convention in any fair way, and those resolutions that we are voting on are simply to put it before the Society so they can vote on it. It does not commit us as a Convention or any of us as individuals to voting for either policy. It simply looks at the great scheme, which has come up, with impartiality, and arranges to put it before the membership at large, where it ought to go. I do think, and would urge on everybody concerned, that we ought to make haste. The thing has gone some time now since Mr. Carnegie made his offer, and due diligence should be exercised by all the societies in coming to some harmonious action on the subject.

I believe the Committee of Fifteen, as far as the Club and the other three societies go, has members appointed by authority of the Boards of those societies, but the three members who acted from this Society, as I understand it, were doing so only informally. I suppose our Board will attend to that matter, and when they do take it up, will appoint a committee, perhaps of three, which will confer with the other societies. I, for one, sincerely hope that, although the Engineers' Club is a good thing to affiliate with, socially, professionally and geographically, yet we should not be five partners in the legal sense of ownership of the property. The four societies can work together, and although one is older and a little bigger than the others, yet the young ones are growing, and I want to insist again on the professional status of those other societies as being remarkably respectable. (Applause.)

MR. HAINES.—Mr. President and Gentlemen: I listened with a good deal of attention to the remarks that were made here yesterday, and in order to keep my own remarks from being too diffuse, I have taken the liberty to reduce them to writing. I do not wish you to suppose it is a speech.

I came here with no more information on this subject than could be gained from the daily papers. I have listened attentively to all that has been said, and in my remarks I shall speak from a standpoint which I hope and believe is occupied by most of the members here present—that is, the attitude of an inquiring mind.

At first sight, one is attracted by the proposition made by Mr. Carnegie, so unexpectedly, with such munificence that the judgment becomes confused and dazzled with the view of apparently unexampled possibilities in the way of co-operation for the advancement of the engineering profession. It is well, therefore, that we should have heard the views of those who have carefully prepared themselves to present this proposition to us, stripped of what has been termed its glamour. After hearing these arguments, we must wonder what is left to be said in its favor.

About one thing I feel greatly relieved. I was glad to hear that the other societies to whom this proposition has been made have already determined to accept Mr. Carnegie's offer, regardless of what action this Society may take. I say that I am glad of this, for we now feel that we are free from any responsibility to them, and that we may consider the proposition solely as affecting the welfare of this Society, without any scruples of conscience as to how our actions may affect their welfare.

Before I make any suggestions in this line, however, there is a word that I would like to say with reference to the sarcastic remarks made at the expense of the Engineer's Club, which added so much to the gaiety of yesterday's session. I listened to these remarks with pain, for I have been a member of the Engineers' Club for nearly twenty years. I see in this assemblage faces which are familiar to me as its members, and the faces of others whom I have seen there enjoying its hospitality. The Engineers' Club has a membership of a thousand members and a large waiting list. It is a prosperous club. I have never heard of its asking alms. Some of its members formed a real estate corporation, and with their own money purchased the building site on Fortieth Street that has been facetiously mentioned here as the back door of the future building of the Engineering Society. I have been on its Board of Governors for five years. I am therefore familiar with the scrutiny to which all applications for membership are subjected. I have had a somewhat similiar experience in the management of this Society, and I am therefore prepared to say that the social standard of membership in the Engineers' Club is fully as high as in this Society. I do not understand that the Engineers' Club sought Mr. Carnegie's money, and I imagine that the majority of its members know little about the merits of the proposed affiliation of the engineering societies, and care less.

It seems, however, that certain gentlemen officially connected with that club, in the ardor of their zeal for its welfare, were imprudently led to associate themselves with this objectionable proposition. Their names have been mentioned in this meeting by those who know nothing more of them than that one of them has occupied an official position in this Society. I may say that I have known them long and well, that I am proud of possessing their friendship, and I feel sure that

Discussion on Joint Engineering Building (continued).

there will be no lack in this meeting of a confirmation of what I have stated.

If I have been led to speak at some length in the defense of the Engineers' Club it is because of the remarks concerning it which I think have been unnecessarily interjected into the discussion, and if what has been said to its disadvantage is to go on record in this meeting, I shall expect that what I have said in its defense shall likewise go there.

Now, I shall confine my remarks to what I consider to be specifically the matter before us, and that is the consideration of the resolutions that the Board of Direction has prepared for discussion at this meeting.

Gentlemen, I ask you to think for a moment as to the origin of these resolutions. They have been prepared by your Board, which is composed of members elected—and elected by a Society vote—from every district represented in this body; men who have the welfare of this Society at heart, and who have carefully weighed the effect of the action which they have recommended you to take. Therefore, these resolutions are entitled to your respectful consideration, and, to my mind, the burden of proof is not so much upon those who speak in their defense as upon those who speak against them. The action suggested by the Board is the result of their investigations made with ample opportunity for arriving at a just conception of the nature of Mr. Carnegie's proposition. Have they flouted at it? Have they indulged in jibes and jokes at the expense of the other societies whose names have been associated with the American Society of Civil Engineers? Far from it. They have approached the subject with a seriousness worthy of its importance. And what have they recommended? Why, that you should properly authorize the Board to make such investigation as will enable the proposition to be submitted to the members for a letter-ballot, intelligently.

What more is proposed? What else can this Society do without exposing itself to the charge of a lack of decency. Who is there that is authorized to reject such a proposition on behalf of this Society except its members, and who is there that will assume to take such a responsibility to himself?

In all that I have said I have not said one word in favor of accepting this proposition. Indeed, I appreciate the force of the argument so carefully prepared, so conclusively presented by our honored Past-President, to whom this Society has been greatly indebted throughout its existence—an argument powerfully reinforced by the opinions of those other eight of our honored members, his peers in the past history of the Society.

I recognize the proud position which our Society has attained. I love the comfort and quiet of our beautiful Society House, our own property, paid for by the contributions of our own members. Not the one-fifth of Mr. Carnegie's gift, not the whole million dollars, if presented entirely to our Society, could add one iota to my enjoyment of the privileges which I so highly value as a member of this Society.

No, Mr. President, it is not for such gentlemen as have been named in support of Mr. Croes' argument; it is not for those who, like myself, have benefited by our past association with the Society, that this proposition offers any advantages. For me, I should far prefer to enjoy what we have in dignified independence.

I listened with interest to the remarks made at the opening of yesterday's session by our Past-President, Mr. Wallace, and to his words of wisdom, after presenting the germs of all that bears on this discussion. My sympathies were entirely in accord with the sentiments which he so forcibly expressed, but he said one thing which has stuck in my mind and which has made a different impression from what he intended. He said that if we should take the step of affiliation with the other Societies, that instead of our Society holding its present proud pre-eminence as the representative of every branch of engineering, we should be placed in the position of representing only a remnant. That is a serious thought—that the American Society of Civil Engineers should ever be put in the position of a remnant. Why, if this is to be the logical conclusion to be drawn from the proposition submitted to us, there can be but one answer to it. Better go back to our former humble abode on Twenty-third Street than to occupy a gilded palace with such a lamentable result. But is there another application of Mr. Wallace's thought? Is it possible that by a process of exclusion we may drive from our membership the mechanical, electrical and mining engineers, and by a further process be deprived of the sanitary engineers, for instance, and the engineers who are contracting for all the municipal and structural works, commercial engineers, if you please? What sort of a residuum would be left to us then? Is the tendency of modern engineering activity to strip our noble tree of one branch after another until nothing is left it but a lifeless trunk?

It is not for the older members of the Society to decide this question; they have no interest in it. This Society will last their time in all its strength and prosperity. It is for the younger members to ponder over. It is a problem which affects their future. I hope that they may solve it as wisely as their predecessors have solved those which have come before them.

At all events, I appeal to every member present to vote for the resolutions presented by the Board. I had proposed to say, without amendment; but it has occurred to me that perhaps their resolution is open to this objection, that the vote upon them by the letter-ballot is intended to be called for—when?

Discussion on Joint Engineering Building (continued).

THE SECRETARY.—Within a reasonable time.

MR. HAINES.—It seems to me that it would be better to provide that this very important matter should take the same course that all other matters of importance have taken in this Society, as, for instance, for the appointment of special committees from time to time, and it seems to me that, with that exception, gentlemen, we should vote for these resolutions, because it places upon the Directors the responsibility which they have requested and which belongs to them by right of their office (applause), carefully to consider and report upon the proposition in connection with the letter-ballot, and leaves the decision where it should finally rest, not with the few members here present, but with the membership throughout the length and breadth of this land. (Applause.)

FREDERICK BROOKS, M. Am. Soc. C. E.—Mr. President, a letter from Professor Swain was read yesterday, making some statements with regard to action taken in Boston; and it was introduced with an expression of doubt as to whether any of the gentlemen concerned in the Boston meeting are here.

I am sorry that there is but a small representation from Boston here; but I was myself present at the beginning of the meeting that was held there a week ago on Monday (although I was obliged to leave before it was over); and I talked upon the subject with my friends there. As the discussion yesterday attached weight to the expressions of opinion already offered by our members, it is proper to state that in Boston there was at least some knowledge of both sides of the question. One gentleman who was quoted here as one of the eight surviving early members of the Society happened to be in Boston about ten days ago; and I had the pleasure of an extended conversation with him in which he mentioned several of the points which he has included in his letter; and the paragraph from Mr. Morison's address, as President in 1895, occurring in Mr. Corthell's letter which was read yesterday by the Secretary, was read at the meeting in Boston. Some of the votes in the Boston canvass were sent by mail by persons not present at the meeting, but there was an attendance of thirty at the meeting.

Let me say a word for myself before I sit down. I share the views so ably presented by the last speaker here. It seems to me that a great deal that was said yesterday was not germane to the real question. It does not seem to me essential to enquire just what is the quality of the different societies involved in this proposition; it is not a question of amalgamation with them or union with them. It is a question of quarters in New York; and I am profoundly impressed with the great desirability of our having friendly relations with the other engineering organizations which have been referred to. It is very desirable that this Society shall have their friendship and sympathy; also that this Society shall have, as far as possible, its influence upon them and have them feel a regard for its ideals. I strongly hope that the resolutions which have been prepared by the Board of Direction will be passed; and I have firm faith that such gentlemen as will naturally be put in charge of business of this character will be able to overcome any moderate difficulties in the way of what I regard as a most desirable consummation. (Applause.)

MR. CATT.—Mr. President, I only wish to take your time for a moment. It seems to me that some of the matter that has been presented to us to-day and yesterday afternoon was probably of the nature of setting up a straw man and then proceeding to knock it down.

Now, I have before me what purports to be the offer of Mr. Carnegie, and I find that in that offer the American Society of Civil Engineers is first mentioned, and that the Engineers' Club was last mentioned, and I do not believe that Mr. Carnegie intended us as an anti-climax. I believe he intended to place the American Society of Civil Engineers as the first among the bodies to which this gift was to be given.

Allow me to say, it is not necessary, of course, that I should say that I have the honor of being a member of the American Society of Civil Engineers, but I have the pleasure of being also a member of the Engineers' Club, and I think that both organizations are eminently able to take care of themselves, and, in their particular lines, are perfectly respectable and creditable. As to whether they should be united in a common building and a common association, as outlined by the gift, would be a serious question. It seems to me that we should approach this question in a somewhat different spirit than has been manifested by some of those who have taken part. The spirit and intent of this gift, as I understand it, is to promote the interest of the engineering profession throughout the country, not only of this Society, but of all other societies, and the profession in general. This Society is unquestionably the ranking Society in this country at the present time. That position, I think will be conceded by the other associations that are asked to join in this movement. I think that the other associations are willing to grant to this Society that position, and I think that our strong position that we hold here would make us, not the people that should be the draggers in this movement, but that we should be the active and earnest people to further the advancement of this project and find some satisfactory solution of the matter.

There are several things that, it seems to me, have been brought in here that really have no connection with this matter. For instance, the Engineers' Club is not the dominant factor here. I think the American Society of Civil Engineers, in the end, will have just as much to say, as to what is to be done with this gift, as any other association. I believe that they will be the dominant force in this

Discussion on Joint Engineering Building (continued).

movement, if they take hold of it in a right manner, and if it is ill-advised to have the Engineers' Club in the same building under an undivided interest, that matter can be arranged for and carefully taken care of. It does not seem to me that it is absolutely essential that the property, even on Thirty-ninth Street, should be made a part of this project. I do not see any mention in the proposed donation that the property on Thirty-ninth Street shall be a part of the project. It may be better, and on investigation prove to be very much better, to have the united building alongside of the present building of the American Society of Civil Engineers. That matter has yet to be determined.

I do not think we should, in any case, take the position that we are either to rule this thing or do nothing, that it must be all our way or not at all; or that we will be like the little girl in the neighbor's yard, that if we cannot have it all our own way, we will take our rag dolls and go home. That is not the spirit in which we should approach this question.

In the matter of the other societies, I think in their several lines, they are as capable and as representative a body of men as we are. They do not cover as broad a field, to be sure, and I think most of them recognize that that is the fact. At the same time, if I were a member of those societies, which I am not, as I am a member of this, and this Society refrained from entering into an earnest endeavor to reach a solution of this problem which would allow us to unite, I would organize a society independent of this society which I would call The Institute of Engineers, and I would invite 250 members of each of the societies of the best, to come to it, and I would make the restrictions higher than those of the American Society of Civil Engineers, and twenty-five years from now it would be the ranking society of this country.

Take as an illustration: I happen to have pretty intimate relations with a good many of the members of these other societies, and I assure you that while they are young, there is not a brighter body of men anywhere than those that compose the Institute of Electrical Engineers. Twenty-five years from now they will be one of the strongest societies in this country, whether we join with them or not. It is as certain as that the time will roll by.

I am very much in favor of leaving this matter with the Board of Direction. I think that this resolution should be adopted, and that they should be given whatever time is necessary to bring the matter to a satisfactory solution. If it is found advisable to separate the common interests from the Engineers' Club, that should be done. Personally, I am in favor of it. I should think the club should have its independent existence entirely apart from the societies.

If it is found advisable that the property selected on Thirty-ninth Street is not entirely satisfactory, I do not see why the Board of Direction cannot remedy this matter. We are not absolutely committed to it, nor is any one else, so far as I know, except possibly the people who were instrumental in securing the option.

For my part I would be in favor of saying to the donor, we thank you, and we will give to this matter such care and consideration that will find a satisfactory solution. I would say to the other societies, we will join you in this matter to the best of our ability to work out a solution of this matter that shall be to the best advantage of the engineering profession. And I would say to the Engineers' Club, we want to join with you in this matter to the best interests of us all, and then I would go forward, sure that this Society could not be injured by any friendly affiliation with the associated societies. (Applause.)

R. W. LESLEY, Assoc. Am. Soc. C. E.—Mr. Chairman, the matter of the resolution seems to me to require possibly one small addition. The Committee of the Board, as I understand it, is limited in its decision as to the question of suitable apartments, or suitable quarters. It seems to me that some amplification of that might be added so that it might cover such facilities, both as to terms and as to regulation. In other words, the question is not merely whether the house suits us. It might suit us very well, but can we pay the rent? That is quite another question. And next, there might be regulations restricting us in our action, which is quite another serious problem. Therefore, it seems to me that some amendment of that might be proposed, simply broadening out that particular clause which would give our committee or our Board of Direction a little further power than is given under the wording of the resolution itself.

As to the question of time, it would seem that in all of our proceedings, in the appointment of every important committee and every important report, there has always been accorded a certain time for consideration and a certain term of notice. It would seem to me that this matter is either one that is good enough to keep or that it will not keep. If it will keep we want it; if it will not keep we don't want it, and therefore it does not seem to me that anything would be injured by giving it the proper consideration that those proceedings have in the general body of this Society.

One more point and I am done. This whole question seems to me to remind one very much of what we read of the debates in the constitutional convention of the United States. A number of States, a number of engineering societies; a number of States with their governments, their treasuries, their legislatures and all of their organization, and that is the case with these societies. It is now proposed to make a United States of Engineering; that can be done as it was with the United States of America. There is a President and

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there are rules and regulations governing all, but the rights of each State are preserved, and each State is independent. Each State is self-contained. Louisiana has the law of France, we have the law of England, but each State has its rights, its powers and its regulations, and yet they are all subservient to the general regulations of a general body. It would therefore seem to me that by widening the power of our Committee some regulations might be introduced in the body that is to govern or in the organization that is to control this building, making it not an affiliation of engineers, but a building for engineers—a United States of Engineering—and under that provision it would be perfectly possible to have a regulation in the voting for the board members like we have for Congressmen; it would be perfectly possible to have a regulation by trustees elected by property rights as we have Senators; and with that thought and with that idea that could be carried out in this case. We might all arrive at a conclusion by which the rights of all of the societies, and all their powers and all their privileges could be maintained, and still have what is proposed here, and be well regulated and well governed, and with all the interests subserved. (Applause.)

Mr. Harrod.—Mr. President, if the gentleman who has just spoken will put his first suggestion in the shape of a resolution I will be very glad to second it. It occurred to me, soon after the reading of those resolutions, that it would be well to entrust the Board of Direction with larger scope, larger authority than seems to be written in them, to give them the opportunity, not only of determining the matter as to the question of accommodation—and the resolution seems to be confined to that—but to give them the authority not only to consider that, but to enter into conference and make their suggestions so as to open the subject wide in order to see if there is any line which is just to this Society and that will lead to final success. Then let their report cover not only the question of accommodation, with arguments *pro* and *con*, but let it cover the whole question.

Mr. Lesley.—If Mr. Harrod will prepare that resolution—he has given the subject more thought than I have—I would like to have you prepare that resolution if you will do it?

Mr. Harrod.—Well, I should like to see the scope of the duties entrusted to the Board of Direction enlarged.

The President.—Major Harrod, will you and Mr. Lesley prepare that amendment?

Mr. Lesley.—Yes, sir.

Mr. Charles Hansel.—Here I have it all prepared. (Laughter.)

Mr. Harrod.—I don't think this exactly meets the point that I have in mind.

Mr. Hansel.—Well, then, I will offer this afterward.

Mr. Seaman.—Mr. President, I have been very forcibly and very favorably impressed, as I think has every one present, with the words of Col. Haines, and with the words of Mr. Catt, and I would like to say that I have, from the beginning, been heartily in favor of a closer association of the national engineering societies if it is practicable or if it can be made practicable, but I think it is important to demonstrate its practicability in every important detail before we jeopardize the ownership of approximately a quarter of a million of dollars and a home which we have established after long years of patience. It is with that anxiety, with a jealous guarding of that home that some of us have been very seriously worried for fear the control of our own property and of our own affairs would pass to the hands of others, and that fear is born of the experience of the past few weeks.

Mr. Carnegie has sent us a most generous offer, and the offer has never reached the Society in the shape in which it was sent. The letter containing the offer and everything it contained has been, it seems to me, coralled by the Engineers' Realty Company, and if I may so express it, it has been tied up in a little plot on Thirty-ninth Street where it looks to me as though they would erect a building for the four National Engineering Societies, and have an entrance to that building over private property owned by the Engineers' Realty Company and used by a social club. That is a pretty strong statement, gentlemen, but it is only reached after looking at the matter very fairly.

Why was the property on Thirty-ninth Street selected, and by whom was it selected? It was selected by the members of the Engineers' Realty Company after they had purchased their property on Fortieth Street. It was selected right back of their property on Fortieth Street. It is proposed to put this magnificent building on a back street, when we, worth approximately a quarter of a million dollars, can afford a better site. The entrance to that building is to be through property owned by the Engineers' Realty Company, and to that extent under their control.

With our present financial standing, with the present financial standing of the American Society of Mechanical Engineers, with the prospective standing of the Institute of Electrical Engineers, why should not the building be located on a more favorable site, such as Fortieth Street? Has the Engineers' Realty Company offered to contribute its site, already bought on Fortieth Street, to the general project? I have not heard of any such proposition. In fact, it is only a week ago that a member of the Engineers' Realty Company said to me, "Mr. Seaman, you will take it as it is, or you won't take it at all." I replied, "Mr. ———, I am ready to vote on that to-morrow."

Those of us who chanced to attend the meeting of May 7th in our own Society house felt that the Engineers' Club did have the control. When Mr. Catt says we control our own affairs, he forgets that we are

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only three in fifteen, and that the Electrical Engineers and that the Mechanical Engineers are, by their very nature, more commercial in their organization than we possibly can be.

It seemed to me that the presentation at that meeting came almost entirely from the Engineers' Club and its affiliations, and when Mr. North arose to ask a few pertinent questions I was dumbfounded when a member then moved that the meeting adjourn. It was after that that Mr. Oberlin Smith arose and said that we should hear from the Civil Engineers, since we had not heard from them, but after a very little more discussion, some resolutions, which had been prepared in advance, were offered, and here is the tenor of them:

"At a meeting held on the evening of May 7th, 1903, in the house of the American Society of Civil Engineers, attended by official representatives of the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Mining Engineers, the American Institute of Electrical Engineers and the Engineers' Club of New York City, it was

* * * * * * * * *

"*Resolved*, that we hereby tender to Mr. Andrew Carnegie our hearty thanks for the trust he has imposed upon us, which we accept with a full realization of its responsibilities, and will endeavor to carry out with all possible dispatch and effectiveness, thereby to hasten the day when engineers shall"——

I haven't the last of it, but, at any rate, that is the acceptance of that proposition in the house of the American Society of Civil Engineers, with the Civil Engineers speaking hardly a word.

Why, gentlemen, it was only for one purpose. Some of us were very much concerned, and quoting from a letter, which I wrote at the request of *Engineering News*:

"It was only then that the members of the American Society of Civil Engineers, who happened to be informally present, awakened to the responsibility they were asked to assume, and it was through their outspoken objection that the message and resolutions were finally modified.

"The experience thus gained does not demonstrate the advisability of placing the management of any of the Society's affairs in committees composed of outside interests."

Mr. Haines.—Excuse me, but my only object in rising is the hope that we may expedite the determination of this question, and as there has been some discussion about the manner or the time in which the proposed report of the directors shall be submitted for letter-ballot, I would offer this resolution:

"It is the sense of this meeting that the letter-ballot called for in the resolutions should be presented to the Society with the usual sixty days' notice and opportunity for discussion in business meeting."

Mr. Hansel.—I second that motion.

The President.—There is a motion before the meeting. Is there any discussion?

Mr. Cross.—The question of the usual sixty days' notice to which Colonel Haines refers is, I suppose, the regulation according to the Constitution that matters which are to come up at the Annual Meeting shall be presented with sixty days' notice and discussed at the Annual Meeting and then presented for ballot. I do not know of any other provision for the usual sixty days' notice for the taking of a letter-ballot and the discussion by the Society before the letter-ballot is presented, but only after a general business meeting, of which there are two, the Annual Convention and the Annual Meeting. Does Col. Haines mean to refer to the constitutional provision regarding the annual meetings in that case at which discussion takes place?

Mr. Haines.—Mr. President, I admit that I left it open intentionally. I desired to get the sense of this meeting as to whether they would prefer to postpone this whole matter, to delay it until it should come up at the Annual Meeting, or whether it might come up for discussion at our usual monthly meetings. In the latter case it would somewhat expedite the consideration of the report and it being spread broadcast through the country to our membership. If it is to be deferred to an Annual Business Meeting, why that delays action upon it, and I purposely left that open. I thought there was an opportunity here to discuss that particular point if the resolution should meet with favor in this body.

Mr. Smith.—Mr. President, it is very much to be deprecated that this whole matter should be left open until the Annual Meeting, and then have another delay in getting ready the ballots and sending out the notices, and then sixty days after for balloting. That puts the whole thing off nearly a year. It seems to me that with the feeling of the other societies, it could not possibly be delayed that long, and we would be simply left out. Perhaps that is what some of us want; some do want to be left out and some do not; that is the very point that the membership ought to decide, whether this Society is going to be left out from this affiliation with what is going to be a great engineering center in New York, with other societies all around, and clubs, and architects' offices, a general headquarters of engineering for the United States and Canada. Any idea of putting it off for about a year before saying whether we will or will not accept that gift probably means our being left out. If this convention wants to take such responsibility and give the membership at large no opportunity to decide the question, so be it, but our Board of Direction should be able to take action, and within the next two or three months settle on something so that the letter-ballot can go out soon. I do not, therefore, favor this sixty days' waiting after the Board of Direction shall satisfy themselves.

Mr. Davison.—Mr. President, I hope that the resolution offered by Col. Haines will be adopted, whether it takes a year or two years or five

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years. I consider that this matter, as expressed yesterday, is one of the most important questions that has ever come before this Society, and I think that we have all gained a great deal of good by being here these two days to listen to the arguments that have been already presented. I feel that all the arguments will not be presented at this meeting, and I think that those who are absent and cannot be reached even by the voice of this meeting should be given all the information that it is possible to give them before they are asked to cast their votes.

As to what this delay may mean to this Society or to the other societies, or to Mr. Carnegie, it is about like this: I understand that the other societies are going ahead with this project, or at any rate, we can come in or stay out as we see fit. I think they will prefer to have us come in, even if we should delay coming in for a year or two, so that it does not affect them seriously. They will have their home whether we come in or not.

As to the effect upon Mr. Carnegie, I would say that I happen to live in a section of the country where Mr. Carnegie's gifts have been very numerous, and the history of those gifts is that they have not always been accepted with the enthusiasm that they seemed to deserve. Years have elapsed before final acceptance in at least two cases that I know of, and there is a gift at present hanging over the heads of the people of that community, and it has been so hanging for a number of years (laughter). Mr. Carnegie is a persistent giver (laughter), and when he makes an offer, he does not expect an answer at once, but desires to have it weighed carefully.

So that I am satisfied that we are not losing our share in this gift by waiting even a year, if we so desire; it will certainly not hurt Mr. Carnegie's feelings if he knows we are carefully considering the matter. and I believe in so considering it. While I do not agree with all the remarks that have been made by the other members, I think it is perfectly proper that we should have all the points, whether or not they are agreeable to us or to others; let us have them all; it may influence us in the right way.

I feel that a great deal has been said that might have been left unsaid, and yet those remarks have certainly educated me. Doubtless some of the members of the Society who are not here to-day may desire to speak upon this subject, and I think they should be given an opportunity, and I believe the first opportunity that can be given them now is at the Annual Meeting next winter, and I think the resolutions should provide, and I believe it is the intention to provide, that there shall be at least one more general discussion of this subject. I think it is absolutely necessary that we should have it. (Applause.)

Mr. Brooks.—Mr. President, if I understand correctly, the resolution of Mr. Haines is before the house; and if so, it is fair to ask what the significance of it is. The opinion has been expressed that the "business meeting" referred to in his resolution means such meetings as are held annually, the Annual Meeting and Annual Convention, of which there are only two in a year. There is another interpretation possible, Mr. Haines says, to wit, that it refers to monthly meetings of the Society. I would like to be informed as to that.

Mr. Croes.—Will Colonel Haines accept an amendment to that, which is that this resolution be presented for discussion at a time not less than sixty days before the next Annual Meeting? That would give time for discussion. I doubt very much whether, during the summer season, the committee which has charge of this matter could obtain all the information that it wants and formulate its ideas, and we do not want to delay it. Nobody wants to delay it to an unreasonable time. I wish to see the matter come before the Society fully and be fully discussed, and to vote with the majority, although I may vote against it at the time. Still the decision of the majority will govern me, but if some little time is given, a little time within which to present this question, say, so that the usual notice before the Annual Meeting can be given, and not later than that.

Oscar Lowinson, Assoc. M. Am. Soc. C. E.—Why not entrust that to the Board?

Mr. Croes.—Well, the Board might lay it over. If you want to make the Board act promptly, give them a limit of time and make that limit of time the sixty days before the Annual Meeting.

Mr. Haines.—Mr. President, as you see, it was evidently my purpose in offering this resolution to take advantage of what has so far been developed in this discussion, and I think you will agree with me in the opinion that it has developed the fact that we know very little about the matter, and that a matter of this grave importance should not be acted upon hastily and with insufficient information.

Now, I think, from the discussion on my resolution, it is plain that the gentlemen here present are of the opinion that there should be further time given for a consideration of this matter before any letter-ballots should be taken. I offer that resolution, not with any purpose to defeat the wishes of the majority of the membership of this Society, but with the purpose of obtaining that opinion and to have it carefully and intelligently rendered. For that purpose, I thought we should have at least sixty days after the report of the Board had been presented, in order to think this matter over before any vote was taken on it.

I will say that I purposely refrained from saying whether the sixty days' notice should be anterior to a monthly business meeting or to the Annual Business Meeting, and it is now quite open to any gentleman here present to offer an amendment that the business meeting shall be the Annual Business Meeting. Now, if that amendment is offered and a vote taken on it, and it is decided that it shall be at the Annual

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Business Meeting, then that amendment would be incorporated in my resolution, and my resolution can go before you with that amendment. If that amendment is voted down then it will evidently be the sense of this meeting that the delay shall only be until a monthly business meeting. I hope the gentlemen that desire to see this matter referred to the Annual Business Meeting will offer an amendment to that effect.

Mr. Smith.—Mr. President, I hope that Col. Haines' motion will stand, although sixty days is rather long to wait for the letter-ballot, as it is better than to put it off until the Annual Meeting. If the amendment is voted on to put it off until that time and then have sixty or ninety days' delay after that——

Mr. Croes.—The Constitution requires sixty days.

Mr. Smith.—But I hope that will date from one of the monthly meetings, as Mr. Haines intended it.

Mr. Haines.—I did not say that.

Mr. Smith.—Well, he evidently left it open, so that it might be from any meeting, a monthly or an Annual Meeting. That leaves it in the hands of the Board of Direction, and that is what I had in mind. They would know much more than we do about it. They live in New York, and are able men, coming in close touch with the other Societies. Leave it to them to hurry up the thing and get it in proper shape. What is the use of this small convention now attempting to put the matter off until the Annual Meeting? Leave the thing as Mr. Haines has put it, and that will give the chance to have the Board of Direction act quickly on the matter, and, if they can present it at a monthly meeting, do so.

There is one point I have to urge against what Mr. Davison has said, that it would be just as well to accept Mr. Carnegie's gift or our share of it a year or two hence or at some other time as well as now. There is one important point that he did not take into consideration. If the other societies, to whom Mr. Carnegie is going to give the thing if we do not go into it, should decide to go ahead and make their building plans, and actually start their building, or, at any rate, get an architect and have the thing worked out before we do anything, then, if we want to come in, we have got to take those plans as they have planned them, and we have got to take a part of a building that we did not plan ourselves. We want a finger in this pie, and we want a big finger in it. If a big building is to be put up, which is partly for us, we want to have a big share in the planning of that building, but if we delay and then finally come in, we have got to take part of a building, in the design of which we have had no share.

Mr. Croes.—I want to make one remark in reply to Mr. Smith. He spoke of the Board of Direction living in the City of New York. They do not live in the City of New York; they live all over the country from Maine to California, and from Canada to New Orleans, and there are thirty of them, and seven of them constitute a quorum Seven members could be got together in New York and constitute a quorum and bind the Board of Direction in a way that we don't want to have done by a small number of men. We want to have a full discussion by the full Board of Direction and have the action of a majority of them.

The Secretary.—For the sake of the record I should like to say that five constitute a quorum.

Mr. Croes.—Five, according to the Constitution, are a quorum, and five members can bind the Board. Now, I do not want to reveal any secrets, or anything, but I know there is one member of the Board of Direction, when this matter first came before them at an informal meeting, and his attention was called to the constitutional provisions which seemed to require delay, who said that this was a case of the application of the old saying, "What is the Constitution among friends?" And he wanted to pass it right off. I don't know how the Board of Direction stands; nobody knows; but they all want to know something about it, and they cannot do it in a limited time, and they must have plenty of time to consider it before they can present it to the Society, or present the report of any committee that can be made. We have got to have a majority of the Board of Direction, I think, and certainly the laws of the State of New York require that in any matter involving real estate, in matters relating to the purchase and sale of property and the disposition of it, it can only be determined by a vote of two-thirds of the Board of Direction, such two-thirds being all present and voting. We cannot limit the time in that way, but we can, I think, do it within a time so as to bring it up at the next Annual Meeting.

I do not want to see any delay; I want the matter brought thoroughly before the Society and discussed, but I do not want to put it in the hands of five men in the City of New York to accept or to make a proposition to present to this Society for consideration—a majority out of five men who live in the City of New York, if there are five directors who live there.

Mr. Davison.—I just wish to reply to Mr. Smith, and to say to him that there is no danger, in my mind, of the other societies going ahead and planning this building so long as this Society courteously asks the time, say six or eight months in which to make up its mind as to coming in, and I am satisfied that Mr. Carnegie will look at it in the same light, and will not care to have the societies go ahead too hastily.

Mr. Hansel.—Mr. President, it seems that the fear of some is that the option on certain land on Thirty-ninth Street may expire. I would suggest that there is another location in the vicinity of Fifty-

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seventh Street that perhaps could be gotten. I do not understand that there is any hurry about this thing at all.

Engineers are sometimes held out of the command of affairs because they are said to be lacking in executive ability, and I feel that organization is the thing that has made this Society. Now, to hazard our organization by giving up our voice in an organization seems to be a very foolish thing to do. I do not understand that anything that is said here to-day is to decide the acceptance or declining of the offer. It is only a talk to get at the views of the members, and if it is to be decided to-day, I certainly would vote against accepting the offer as it is now made.

I am unfortunate in that I am also a member of the Engineers' Club (laughter); it seems that I am unfortunate, although I am happy to say that I am a member of that Club. Some engineers are afraid that they are on the side of commercial engineering. I am, and I am trying to get stronger on that side every day (laughter). If an engineer has not anything to sell he does not belong to our Society, because he sells his talent and his skill, if he has anything at all. All engineers are eligible to our Society. I don't say that all who say they are engineers are, but all engineers are eligible to the American Society of Civil Engineers.

The American Society of Civil Engineers, as I understand it, is called civil engineers simply because they are an independent association and are not in the service of the Federal Government, and if they are to preserve their independence, it seems to me that, under any conditions of the acceptance of this offer, they should have their home as it is now. I certainly would never consent to give up my home to share in a hotel, and I want to ask if it is in order to suggest a specific time for a special meeting, say, sixty or ninety or one hundred and twenty days, or ten months, if you please, from now—a specific time for a special meeting. As I understand it, there are only two opportunities for a business meeting, at the Annual Meeting and at the Annual Convention, and it seems to me a special meeting should be called for the consideration of a subject that is, to my mind, exceedingly important. (Applause.)

Mr. Smith.—I would like to ask a question of the Secretary which is pertinent. I don't think a great many of us here know about our own real estate. It has been stated that it was worth about a quarter of a million, and probably it is. I want to ask the Secretary whether it is property that can easily be disposed of, on account of the nature of the building and the neighborhood, and what his estimate is of the probable value that we could get for it if we sold it.

The Secretary.—Mr. President, recent inquiry as to the value of property in the immediate vicinity of the Society House leads me to suppose that it is worth about $70 000 for a 25-ft. lot, and that you cannot get it for $100 000; that is about all I can say as to the value of the land.

Mr. Smith.—Well, our 50-ft. lot would be worth about $200 000?

The Secretary.—We paid $40 000 per lot, or $80 000 for the 50 ft. If the present building were not on those lots I believe they could be sold for $150 000 or $160 000 at any time.

Mr. Seaman.—What did the building cost?

The Secretary.—The building itself, about $90 000, I think, as near as I can remember it.

Mr. Smith.—Has there been any estimate as to how much it could be sold for to remain as it is, for other purposes, public purposes?

The Secretary.—That is a difficult matter. You would have to find a customer for it, find somebody who would fit into it. As a matter of fact, it seems to me that that building would lend itself very well indeed to almost any not too large club. It is so arranged that club kitchens could be installed; there is ample space for that in our present storage room, and the larger rooms for dining rooms, and all that sort of thing, and if you leave out the question of sleeping apartments, which almost all New York clubs are coming to now, it would be an ideal small clubhouse, although built entirely for the purposes of our Society.

Mr. Smith.—Would it work in connection with art schools or something of that kind? We seem to be in an artistic neighborhood. Could it be used for any artistic purposes?

The Secretary.—I should think it might; I can see no reason why not. It has good light.

Mr. Hansel.—Mr. President, I asked if it was in order to name a special day or a day for a special meeting to consider this subject.

The President.—That may be offered as an amendment to the resolution which Mr. Haines has proposed.

Mr. Hansel.—Well, I did not know but that if it was offered it would conflict with the Constitution. I understand that any new business has to come up at either the Annual Meeting or the Annual Convention, and I ask for information, Mr. President.

The President.—We are advised by counsel that it is perfectly legal for the Board of Direction or for this Convention to accept or reject the Carnegie proposition if that action was thought wise. It is perfectly legal for the Convention or for the Board at any meeting to do that.

Mr. Hansel.—Yes, but that is not the point I was after. Is it legal, under our Constitution, to appoint a day for a special meeting of the Society to consider this question?

The Secretary.—There is nothing in the Constitution to prevent that, so far as I know.

Discussion on Joint Engineering Building (continued).

Mr. Davison.—I would amend Col. Haines' resolution by inserting in it the words "the Annual Meeting" of the Society.

Emil Swensson, M. Am. Soc. C. E.—I second the motion.

The President.—The Secretary will read the resolution.

The Secretary.—It is the sense of this meeting that the letter-ballot called for in the resolutions should be presented to the Society with the usual sixty days' notice, and opportunity for discussion in business meeting.

The President.—The Chair understands that Mr. Haines offers that as an amendment to the resolution which is before the meeting. That is the only way it can have consideration.

Mr. Haines.—Yes, sir.

Mr. Catt.—I will second Mr. Haines' motion.

The President—And Mr. Davison's amendment to this is what?

The Secretary.—That it is the sense of this meeting that the letter-ballot called for in the resolutions should be presented to the Society with the usual sixty days' notice and opportunity for discussion at the next Annual Meeting.

Mr. Harrod.—I second that.

The President.—That is Mr. Haines' resolution as amended by an amendment offered by Mr. Davison. Are there any remarks?

Mr. Davison.—I would suggest the Annual Meeting, for the reason that any other meeting would generally be attended by the local members in New York alone, while the Annual Meeting will be attended by the members at large, and I am satisfied, from the interest displayed in this meeting, that we will have a rousing old meeting if it should go through.

Mr. Smith.—I understand that this vote now is on the amendment to Mr. Haines' resolution, and I certainly hope it will not go through because it takes it out of the power of the Board to act quickly if they want to.

(Cries of "Question"!)

The President.—The motion is on the provision that the matter will be considered at the Annual Meeting of the Society.

The motion, being put, was carried.

The President.—Now the question before the meeting is the resolution offered by Col. Haines as amended. All in favor of Col. Haines' amendment as read and amended, say aye.

The motion was carried.

The President.—The question is now on the resolutions offered by the Board as amended by Mr. Haines' resolution?

Mr. Harrod.—I would like to offer an amendment to the resolutions of the Board. There are six resolutions submitted by the Board, and I would like to offer this amendment to the third resolution. It now reads:

"*Resolved*, that the Board of Direction be authorized to ascertain whether suitable accommodations can be obtained for the Society in the proposed new building, with provision for future needs."

I offer as an amendment to add to that:

"And also to make such investigations and hold such conferences as may bear upon the advisability of the acceptance of Mr. Carnegie's proposition by this Society."

That is simply to enlarge the scope of the work of the Board of Direction. If that is passed it makes a slight change necessary in the fifth resolution that reads:

"*Resolved*, that the Board of Direction be requested, provided it is satisfied that suitable accommodations can be obtained," and I would amend it by inserting the words, "and that the acceptance of the proposition is otherwise practicable."

Mr. Swensson.—I second that amendment.

The motion, being put, was carried.

The President.—The question is now on the resolutions offered by the Board as amended.

The motion, being put to vote, was carried.*

The President.—The resolutions are adopted.

Mr. Hansel.—Mr. President, I understand that the Society, as the American Society of Civil Engineers, has never acknowledged to Mr. Carnegie the receipt of the offer which he has tendered this Association. If so, I desire to offer this resolution:

Resolution of thanks to Mr. Carnegie.

"*Resolved*, that the American Society of Civil Engineers acknowledge the offer from Mr. Carnegie, and thank him sincerely for the opportunity, and advise him at the same time of the action to-day, and that the object of this delay is to determine and consider every feature of the situation carefully before deciding the matter."

Mr. Swensson.—I second the motion.

The motion, being put to vote, was carried.

Announcements as to Programme.

The Secretary.—Mr. President, the Chairman of the Local Committee, Mr. Ludlow, wishes to make some announcements as to the programme.

Mr. Ludlow.—Mr. President, Ladies and Gentlemen: I wish to announce in reference to the programme of entertainment for to-day and to-morrow, and some other incidental matters, that this afternoon, as you will notice by the programme, our purpose is to have a trolley ride covering the most interesting portions of the city, which will require about eighty minutes, including a ride to Riverside Park and one other suburban line, and this trolley ride will end at the golf grounds, where preparations for a golf tournament by engineers is under way, and when I say it is by engineers, it means that it will outclass any championship games that have been held in Asheville for a number of years, doubtless. Mr. Hunt has the matter in charge, and anyone who desires to participate in this tournament this afternoon will report

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* The resolutions as adopted may be found on page 199.

Announcements (continued).

either to Mr. Hunt or to Mr. Guild, of the Local Committee, who are making the entries and arranging the handicaps, etc.

Immediately after the adjournment of this morning's session, there is a photographer here who is very enterprising and very capable, and he tells me that he has taken all sorts of group pictures of distinguished bodies that have visited Asheville, but he has never had an opportunity of getting a picture of a number of engineers, and he is particularly anxious that he be afforded an opportunity.

A MEMBER.—Is this another question of affiliation?

MR. LUDLOW.—And while none of us care particularly about seeing our names in print, or our faces on cardboard, I would ask that immediately after adjournment just by way of courtesy to this photographer, we gather on the green on the hillside just in front of the hotel and permit him to perpetuate with the camera a memento of the occasion of this convention in Asheville.

A MEMBER.—What is the time of the trolley ride, sir?

MR. LUDLOW.—Three o'clock is the hour stated, and we will adhere to that as nearly as possible.

We have a card, handed in yesterday, which I placed in the hands of the Secretary, from the Asheville Club, a social organization, which very kindly tenders a card to all the members of the Society and guests, and the courtesies of the club house for a period of fifteen days.

The courtesies of the Golf Club have also been extended, which I believe was announced yesterday, by our Secretary, from the platform.

As to the matters for to-morrow, I think that everything is quite fully stated on the printed programme. To-morrow evening, as we return from Overlook Mountain, we will have some entertainment here at the hotel.

On Friday, as you will note by the programme, we have booked the ride to Biltmore. For this drive we have arranged with the liveryman—they have a liverymen's association here, and they have agreed to provide carriages to accommodate the entire party, all nice vehicles that will be comfortable, as well as pleasant to see, and they will be here at some hour on Friday morning to arrange the matter. I think the hour for the Biltmore drive will be determined largely by the condition of the weather on Friday morning, if we find that it is practicable and no other conflicting engagements have been made. For this occasion it has been arranged with the local liveryman that carriages will be furnished to hold as many as they will accommodate comfortably, three, four, or half a dozen, and that instead of each carriage being paid for separately, there will be tickets furnished, and they will be on sale by to-morrow at $1 per person, which will include the carriage drive through Biltmore and Victoria Park, embracing a drive of about four or five hours.

I would say in passing, that the Local Committee would like very much to have included this in the provisions they have made for your pleasure, but the Secretary says that the members of the American Society of Civil Engineers don't like to have things paid for for them; they like, at least, to think they are doing things themselves (applause and laughter), so we have compromised the matter and will let you pay for your tickets for the Biltmore drive.

The Secretary.—Mr. President, I would like to announce that through the kindness of Herbert M. Wilson, M. Am. Soc. C. E., geological sheets of Asheville and the vicinity are in the office of the Secretary and may be had upon application. They will doubtless be found of interest to our members in traveling around here.

Mr. Ludlow.—I have one more announcement to make. The Southern Railway ticket agent has just come to see me as to the return trips and the accommodations for sleepers, etc. It distresses us to think about return trips so early, but perhaps for convenience and comfort it had better be mentioned. I have arranged with the Division Passenger Agent that he be here himself, or have a representative here at the hotel to-morrow evening at nine o'clock to make bookings for the return trip on the Pullman service, and he is anxious to get this information as early as possible, so as to furnish plenty of cars and accommodations. He states in confidence that he will endeavor to furnish every one with lower berths and drawing-room space, so any of you who have fixed the time of your departure by to-morrow night can see the ticket agent and secure your reservations.

Adjourned.

EXCURSIONS AND ENTERTAINMENTS DURING THE THIRTY-FIFTH ANNUAL CONVENTION.

The arrangements for the Convention were in the hands of the following Committees:

Committee of the Board of Direction:

J. James R. Croes, *Chairman;*

George H. Pegram,
Chas. Warren Hunt.

Committee of Local Members:

J. L. Ludlow, *Chairman;*

William Cain,
Wilbur F. Foster,
George W. Frank,
J. C. Guild,
J. N. Hazlehurst,
W. B. W. Howe,
W. A. Leland,
J. Imbrie Miller,
J. A. Montgomery,
E. T. D. Myers,
Arthur Pew,
George O. Tenney,
Nisbet Wingfield.

By courtesy of the Pennsylvania and the Southern Railroads, the members of the Society and their guests were accommodated in special cars from New York to Washington, and in a special train from Washington to Asheville. The party left New York at 11 A. M. on Monday, June 8th, and arrived at Asheville on the following day at 9 A. M.

The Trunk Line, Southeastern, and Central Passenger Associations, granted a rate of one first-class fare, plus 25 cents, for the round trip to and from Asheville, from all points in their territories.

In the afternoon of Wednesday, June 10th, by the courtesy of the Asheville Electric Company, a trolley trip around Asheville was made by a large party of members and guests. The trip terminated at the Swannanoa Country Club, where, by courtesy of the club, a special golf competition was held.

On Wednesday evening the members and guests of the Society were received by the Hon. Charles B. Aycock, Governor of North Carolina.

On Thursday afternoon, by invitation of Richard S. Howland, Esq., President of the Asheville and Craggy Mountain Railroad Company, the members and guests visited Overlook Park, on Sunset Mountain, where they spent the afternoon and enjoyed a "Barbecue" prepared especially for them. The features of the Asheville and Craggy Mountain Electric Railroad were described in a pamphlet by R. H. Tingley, M. Am. Soc. C. E., who built the road up the mountain.

In the evening a concert and Southern Plantation Entertainment was enjoyed by a large audience.

On Friday a large party took carriages and drove through the grounds of "Biltmore," the estate of George W. Vanderbilt, Esq.

THE ATTENDANCE AT THE THIRTY-FIFTH ANNUAL CONVENTION.

The following 122 members were in attendance:

Allen, C. H	New York City
Atkinson, J. B	Earlington, Ky.
Bacon, J. W	Danbury, Conn.
Baird, Howard C	Phœnixville, Pa.
Barnsley, George T	Oakmont, Pa.
Betts, E. E	Chattanooga, Tenn.
Braune, G. M	Birmingham, Ala.
Brenneke, W. G	St. Louis, Mo.
Breuchaud, J	Yonkers, N. Y.
Brooks, Fred	Boston, Mass.
Cain, William	Chapel Hill, N. C.
Carson, W. W	Knoxville, Tenn.
Catt, George W	New York City
Chapin, L. E	Canton, Ohio
Chester, J. N	Pittsburg, Pa.
Clark, L. V	Philadelphia, Pa.
Clayton, R. M	Atlanta, Ga.
Condron, T. L	Chicago, Ill.
Connor, E. H	Leavenworth, Kans.
Cooper, Samuel L	Yonkers, N. Y.
Crane, Albert S	Chicago, Ill.
Croes, J. J. R	New York City
Cummings, Robert A	Pittsburg, Pa.
Davis, Chas	Allegheny, Pa.
Davison, George S	Pittsburg, Pa.
Diebitsch, Emil	New York City
Douglas, B	Detroit, Mich.
Dyer, Arthur J	Nashville, Tenn.
Ellis, John W	Woonsocket, R. I.
Foster, E. H	New York City
Francis, George B	New York City
Frank, George W	New London, N. C.
Gillespie, R. H	New York City
Goodell, John M	New York City
Grantham, Herbert T.	Philadelphia, Pa.
Green, Bernard R	Washington, D. C.
Guild, J. C	Chattanooga, Tenn.
Haines, H. S	Detroit, Mich.
Hanna, John V	St. Louis, Mo.
Hansel, Charles	New York City
Harlow, J. Hayward, Jr.	Conowingo, Md.
Harris, Van Alen	San Juan, Porto Rico
Harrod, B. M	New Orleans, La.
Hatt, W. K	Washington, D. C.
Hermann, E. A	St. Louis, Mo.
Hider, Arthur	Greenville, Miss.
Hinckley, J. F	St. Louis, Mo.
Horton, Horace E	Chicago, Ill.
Hotchkiss, C. W	Chicago, Ill.
Howard, John Lewis	Boston, Mass.
Hunt, Chas. Warren	New York City
Hyde, Charles Gilman	Harrisburg, Pa.
Jackson, J. M	Parkersburg, W. Va.
Johnson, A. L	St. Louis, Mo.
Johnson, J. M	Louisville, Ky.
Johnson, L. J	Cambridge, Mass.
Judson, Wm. Pierson	Albany, N Y.
Juengst, H. F	Birmingham, Ala.
Kendrick, J. W	Birmingham, Ala.
Kimball, Frank C	Knoxville, Tenn.
King, Paul S	New York City
King, Wallace, Jr	New York City
Lesley, R. W	Philadelphia, Pa.
Lowinson, O	New York City
Lucas, E. W. Van C	Memphis, Tenn.
Ludlow, J. L	Winston, N. C.
McCalla, R. C	Tuscaloosa, Ala.
McDonald, Hunter	Nashville, Tenn.
McLain, L. R	St. Augustine, Fla.
McMinn, T. J	New York City
Maltby, F. B	Memphis, Tenn.
Maxwell, J. R	Newark, Del.
Martin, William	Bellevue, Pa.
Melvin, David N	Linoleumville, N. Y.
Miller, J. Imbrie	Montreat, N. C.
Miller, Rudolph P	New York City
Modjeski, Ralph	Chicago, Ill.

Montfort, R.	Louisville, Ky.
Montgomery, J. A.	Birmingham, Ala.
Morris, Marshall	Louisville, Ky.
Myers, E. T. D., Jr.	Richmond, Va.
Myers, E. W.	Greensboro, N. C.
Nicholson, George B.	Covington, Ky.
Noble, Alfred	New York City.
Osborn, Frank C.	Cleveland, Ohio
Pegram, Geo. H.	New York City
Pew, Arthur	Bolton, Ga.
Polk, Wm. Anderson	New York City
Pope, Macy S.	Boston, Mass.
Potter, H. W.	New York City
Pressey, H. A.	Washington, D. C.
Reed, W. Boardman	New York City
Riggs, M. J.	Toledo, Ohio
Ruggles, Charles A.	New York City
Russell, S. Bent	St. Louis, Mo.
Schaub, J. W.	Chicago, Ill.
Schneider, C. C.	Pencoyd, Pa.
Scofield, E. M.	Pittsburg, Pa.
Seaman, Henry B.	New York City
Shedd, Edward W.	Providence, R. I.
Shedd, J. Herbert	Providence, R. I.
Shryock, Joseph G.	Philadelphia, Pa.
Smith, Oberlin	Bridgeton, N. J.
Snow, J. P.	Boston, Mass.
Swensson, Emil	Pittsburg, Pa.
Thacher, Edwin	New York City
Tillson, Geo. W.	Brooklyn, N. Y.
Tingley, R. H.	New York City
Trundle, H. H.	Leesburg, Va.
Van Horne, John G.	New York City
Wadsworth, J. E.	New York City
Wagner, Samuel Tobias,	Philadelphia, Pa.
Wallace, J. F.	Chicago, Ill.
Warder, J. H.	Chicago, Ill.
Wegmann, E.	Katonah, N. Y.
Wiley, Wm. H.	New York City
Wilson, H. F., Jr.	Birmingham, Ala.
Wilson, H. M.	Washington, D. C.
Winfree, P. B.	Lynchburg, Va.
Wingfield, Nisbet	Augusta, Ga.
Wölfel, Paul L.	Philadelphia, Pa.
Worcester, J. R.	Boston, Mass.

The total registered attendance at the Convention was as follows:

Members of the Society, in all grades	122
Guests, including ladies	133
Total	255

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, September 2d, 1903.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper entitled "An Experimental Study of the Resistances to the Flow of Water in Pipes," by Augustus V. Saph, Assoc. Am. Soc. C. E., and Ernest W. Schoder, Jun. Am. Soc. C. E., will be presented for discussion. This paper was printed in *Proceedings* for May, 1903.

Wednesday, September 16th, 1903.—8.30 P. M.—At this meeting two papers will be presented for discussion, as follows: "Theory of Centrifugal Pumps and Fans; Analysis of their Action, with Suggestions for Designs," by Elmo G. Harris, M. Am. Soc. C. E. (printed in *Proceedings* for May, 1903); and "Tests of the Efficiency of Hoisting Tackle," by S. P. Mitchell, M. Am. Soc. C. E., printed in this number of *Proceedings.*

Wednesday, October 7th, 1903.—8.30 P. M.—A regular business meeting will be held. Ballots for membership and ballots on the proposed amendment to the Constitution will be canvassed, and a paper by Francis Robert Johnson, M. Am. Soc. C. E., entitled "South African Irrigation," will be presented for discussion. This paper is printed in this number of *Proceedings.*

Wednesday, October 21st, 1903.—8.30 P. M.—At this meeting two papers will be presented, as follows: "Some Railway Construction in Oklahoma," by A. G. Allan, Assoc. M. Am. Soc. C. E.; and "The Fatigue of Cement Products," by J. L. Van Ornum, M. Am. Soc. C. E. These papers are printed in this number of *Proceedings.*

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction to the members who have made use of the resources of the Society in this manner has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling compared to the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches for members to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

ACCESSIONS TO THE LIBRARY.

From May 13th to August 8th, 1903.

DONATIONS.*

TREATISE ON HYDRAULICS.

By Mansfield Merriman. Eighth Edition, Rewritten and Enlarged, Cloth, 9 x 6 ins., 8 + 585 pp., illus. New York, John Wiley & Sons. 1903. $5.00.

Since the publication of the first edition of this treatise, in 1889, many advances have been made in hydraulics. Some of these have been noted briefly in later editions, but to record and correlate them properly it has become necessary to rewrite and reset the book. The same plan of arrangement as in former editions has been followed, but two new chapters have been added, one on Hydraulic Instruments and Observations, which treats of the methods of measuring pressures and velocities, and another on Pumps and Pumping, in which the various machines for raising water are discussed from a hydraulic point of view. Many new examples and problems are given, and in these the author has endeavored, not only to simplify the theory of the subject, but also to illustrate the conditions of actual practice. Historical notes and references to hydraulic literature are presented with greater fullness than before. While the main purpose in rewriting the book has been to keep it abreast with modern progress, the attempt has also been made to present the subject more concisely and clearly than before, in order to advance the interests of thorough education and to promote sound engineering practice. The chapter headings are: Fundamental Data; Hydrostatics; Theoretical Hydraulics; Instruments and Observations; Flow through Orifices; Flow over Weirs; Flow through Tubes; Flow through Pipes; Flow in Conduits; Flow of Rivers; Water Supply and Water Power; Dynamic Pressure of Water; Water Wheels; Turbines; Naval Hydromechanics; Pumps and Pumping; Tables for English Measures; Tables for Metric Measures; Tables for all Measures. There is an index of nine pages.

MUNICIPAL PUBLIC WORKS.

Their Inception, Construction and Management. By S. Whinery. New York, The Macmillan Company, 1903. $1.50 net.

The preface states that this book is intended for the inexperienced city official and for the urban citizen. The veteran in municipal service and the student of municipal administration will not find in the book much that is new to them, although they may find that some matters are presented from points of view different from those to which they have been accustomed. The author has tried to avoid technical treatment of the subjects, and has introduced statistics and details only where they seemed necessary to illustrate or enforce the general statements. The idea has been to deal with principles rather than with details of practice. The Contents are: Importance of Municipal Public Works; Municipal Organization; Preparations for Municipal Work; Direct Work *vs.* Contract Work; Advertising, Opening Bids, and Awarding Contracts; The Contract; The Contractor; The Supervision of Public Work; Maintenance and Repair of Public Work; Economy, Real and False; Guaranteeing Public Work; Special Assessments; Municipal Accounts and Uniform Accounting; Municipal Ownership; Quasi-Public Corporations and their Control.

PRACTICAL FARM DRAINAGE.

Why, When, and How to Tile Drain. By C. G. Elliott. Cloth, 7½ x 5 ins., 7 + 92 pp., illus. New York, John Wiley & Sons, 1903. $1.00.

This book is intended for those who are interested in the subject of farm drainage. It gives to the farmer in a concise and plain manner, the elementary knowledge of why, when, where and how to drain his farm. The practical methods described have been well tested, and are now in constant use by practical men. The chapter headings are: Soils and the Relation of Drainage to Them; Action of Drains Upon the Soil; Leveling and Locating Drains; Depth and Size of Drains; Practical Details of the Work; Ditching Machines; Cost and Profit; Road Drainage.

EARTHWORK AND ITS COST.

By Halbert Powers Gillette, M. Am. Inst. M E. Cloth, 8 x 5 ins., 10 + 244 pp., illus. New York, The Engineering News Publishing Co., 1903. $2.00.

The author states in the preface that his principal object in this book has been to outline rational methods and rules to be used in cost calculation of earthwork, and that the only way a truly economic design for a structure can be made is by knowing every item of actual cost, and this in turn can only be known by a study of the tools and methods used in construction. As a class book and as an office book, this volume is intended to be of service in indicating the proper methods of solving problems of engineering economics in general, as well as those of earthwork in particular. The Contents are: Introduction; Earth Shrinkage; Earth Classification; Cost of Loosening and Shoveling; Cost of Dumping, Spreading, Rolling, etc.; Cost by Wheelbarrows and Carts; Cost by Wagons; Cost by Buck and Drag Scrapers; Cost by Wheel Scrapers; Cost by the Elevating Grader; Cost by Steam Shovels; Cost by Cars; How to Handle a Steam Shovel Plant; Summary and Table of Costs; Cost of Trenching and Pipe Laying; The Cost of Hydraulic Excavation; Cost of Dredging; Miscellaneous Cost Data; Frozen Earth; Earth and Earth Structures; Appendix A, Rapid Field and Office Survey Work; Appendix B, Overhaul Calculation; Appendix C, A Small "Home Made" Dipper Dredge or Steam Shovel. There is an index of ten pages.

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* Unless otherwise specified, books in this list have been donated by the Publishers.

NOTES ON TRACK

Construction and Maintenance. By W. M. Camp, M. Am. Soc. C. E. Cloth, 10 x 7 ins., 8 + 1 214 pp , illus. W. M. Camp, Chicago, 1903. $3.00. (For the foreign trade issued in two volumes at $3.50.)

The author states in the preface that this book treats of the construction and maintenance of railroad track from the standpoints both of the trackman and the engineer, and gives a thorough-going treatment of details, as well as of general principles. The book was published originally as a series of articles in the *Railway and Engineering Review*, but in the revision for its publication in book form, the volume of matter contained in the articles has been greatly increased and elaborated upon. The aim has been to follow practice down to date and give reference to all new improvements which seem likely to assume future importance. Every phase of track construction and track work has been treated, special attention having been paid to costs and other data, and, particularly to the development of modern labor-saving machinery in track work. The chapter headings are: Track Foundation; Track Materials; Track-Laying; Ballasting; Curves; Switching Arrangements and Appliances; Track Maintenance; Double-Tracking; Track Tools; Work Trains; Miscellaneous; Organization; Supplementary Notes and Tables. There is an index of eighteen pages.

THE CAR BUILDERS' DICTIONARY.

An Illustrated Vocabulary of Terms which Designate American Railroad Cars, Their Parts, Attachments, and Details of Construction. Compiled for the Master Car Builders' Association, by Rodney Hitt, Assisted by A. M. Waitt, J. S. Lentz, W. P. Appleyard. 1903 Edition. Morocco, 12 x 8½ ins., 374 pp., illus. New York, *The Railroad Gazette*, 1903. $5.00.

The original idea of the Car Builders' Dictionary, as stated in the preface, was to standardize car-building language. Since 1895, however, the book has been used largely as a guide for ordering, designing and specifying cars, and parts of cars, and the present edition has been prepared with a view to facilitate its use for such purposes. While the definitions have not been materially changed in this edition, they have been carefully edited in order to eliminate the ancient history which many of them contained, to condense and modernize the descriptive matter, and to make that part of the book more of a ready-reference section than an encyclopedia. The number of illustrations has been reduced from 5,683 in 1895 to 4,971 in 1903, the object being to show nothing that is experimental or rapidly going out of use, but only such devices and cars as are in general use at this time. Wherever possible the name of the maker of each device has been placed under the engraving, and in many cases, the maker's designation, or number of the part has been preserved. One new feature has been added in the general arrangement of the illustrated pages, that of Car-Shop Machinery, the engravings, however, being limited to a few of the most common forms of woodworking machines and pneumatic tools. Particular attention has been given to the selection of drawings of freight-car bodies. Since 1895, the use of steel cars has rapidly increased, and those illustrated represent the latest types, and may be taken as good examples of present practice. Drawings for wooden cars are given more in detail. The illustrations of the types of the standard systems of framing for passenger cars cover a large proportion of the passenger equipment now in use. The treatment of electric cars has been meager. In preparing that part of the book which includes the Master Car Builders' standards and recommended practice, the aim has been to preserve as nearly as possible the order in which the engravings appear in the *Proceedings* of the Association, and under each engraving is given the reference to the plates shown in the *Proceedings* for 1902. With one or two exceptions all the historical and descriptive matter printed under the head of Rules for Interchange of Traffic, and Standards and Recommended Practice, has been included in the section of the book devoted to definitions. There is an index of two pages to engravings.

DESIGN OF DYNAMOS.

By Silvanus P. Thompson. Cloth, 9 x 6 ins., 7 + 253 pp., illus. New York, Spon & Chamberlain, 1903. $3.50.

The author states that these notes on Dynamo Design are not intended to supersede the more complete handbooks on the special branch of electrical engineering of which this is only a part, and having been designed primarily for his own students, are purposely confined to continuous-current generators. As the work will be used by engineers, chiefly in Great Britain, in her Colonies, and in the United States, the calculations and data have been expressed in inch measures, but the author has adopted throughout the decimal subdivision of the inch, small lengths being given in mils, and small areas of cross-section in square mils, or, sometimes also, in circular mils, to suit American practice. In the section on Armature Winding Schemes, special attention is given to series-parallel windings, and to the doctrine of the "equivalent ring." The chapter headings are: Dynamo Design as an Art; Magnetic Calculations as Applied to Dynamo Design; Copper Calculations: Coil Windings; Insulating Materials, and their Properties; Armature Winding Schemes; Estimation of Losses, Heating and Pressure Drop; The Design of Continuous-Current Dynamos; Examples of Dynamo Design; Appendix I, Wire-Gauge Tables (Copper), British; II, Wire-Gauge Tables (Copper), American; III, Schedules for Design of Continuous-Current Dynamos. There is an index of thirteen pages.

A MANUAL OF USEFUL INFORMATION AND TABLES APPERTAINING TO THE USE OF STEEL.

As Manufactured by the Passaic Steel Company, Paterson, N. J. For Engineers, Architects and Builders. By Geo. H. Blakeley, M. Am. Soc. C. E. Leather, 7 x 4 ins., 324 pp., illus. New York, 1903. $2.00. (Donated by the Author.)

The present edition remains the same as the 1899 and 1901 editions, with a few minor changes. It is intended to supply special information and tables of value and service to those engaged in the design of structural steel work. Only such matter is given as the author has found to be of service in his own practice. The Contents are: Shapes Manufactured by Passaic Steel Company; Structural Details; Properties of Passaic Structural Shapes; Traverse Strength of Passaic Structural Shapes; Beam Girders; Strength and Deflection of Beams; Moments of Inertia of Usual Sections; Fireproof Construction; Building Laws; Spacing of I-Beams for Floors; Riveted Girders; Suddenly Applied Loads; Lintels; Columns; Properties and Safe Loads; Foundations; Wind Bracing. Wooden Beams; Wooden Columns; Roofs; Bridge Trusses; Passaic Standard Railroad Turntables; Specifications for Structural Steel; Corrugated Iron; Rivets and Pins; Bolts and Nuts; Buckle Plates; Sleeve Nuts; Loop Rods; Eye Bars and Pins; Clevises; Linear Expansion by Heat; Areas and Weights of Bars, Flats and Plates; Miscellaneous Tables; Ultimate Strengths of Materials; Weights of Various Substances; Mensuration; Areas and Circumferences of Circles; Weights and Measures. There is an index of seven pages.

HENDRICKS' COMMERCIAL REGISTER

Of the United States. For Buyers and Sellers. Especially Devoted to the Interests of the Architectural, Mechanical, Engineering, Contracting, Electrical, Railroad, Iron, Steel, Mining, Mill, Quarrying and Kindred Industries. Twelfth Annual Edition. Cloth, 10 x 7½ ins., 46 + 1128 pp. New York, Samuel E. Hendricks Co., 1902. $6.00.

This book is an annual index of the above-mentioned industries, containing names, addresses and business classifications, with full lists of the manufacturers of, and dealers in, everything used in the manufacture of material, machinery and apparatus for these industries. There is an index of forty-six pages.

TRAITÉ DE LA CONDENSATION.

Condensations indépendantes; Condensations centrales; Refroidissement artificiel de l'eau. A l'usage des Constructeurs de machines à vapeur, des Ingénieurs d'usines métallurgiques, de mines, de fabriques de sucre, de produits chimiques, etc. . . et des Elèves des Ecoles Industrielles. Par F. J. Weiss. Traduit par E. Hannebicque. Sur la première édition allemande revue et augmentée par l'auteur. Paper, 10 x 6½ ins., 10 + 507 pp., illus. Paris, Vve. Ch. Dunod, 1903. 20 francs.

This work, notwithstanding its title, deals not only with condensation in the strict sense of the word, but also with all questions connected with condensation. The Con-

tents are: Condensation par Mélange; Condensation par Surface; Temps nécessaire pour établier le vide dans le Condenseur; Puissance nécessaire; Utilité de la Condensation; Calcul complet d'une grande Condensation centrale; Conduite d'échappement; Régulation des machines à Condensation; Distribution Weiss; De la Condensation dans les Machines; Refroidissement artificiel de l'eau; Tables de Regnault.

GEMEINFASSLICHE DARSTELLUNG DES EISENHÜTTENWESENS.

Herausgegeben vom Verein Deutscher Eisenhüttenleute in Düsseldorf. 5. Auflage. Cloth, 9 x 6 ins., 12 + 164 pp., illus. A. Bagel, Düsseldorf, 1903. 3 marks.

The first part of the fifth edition remains almost entirely unchanged, whereas the second part has received many additions which correspond to the changes in the economical situation of the iron industry. The appendix has also been enlarged by lists of German beam, rail, bar, hoop, rough tin, refined tin, wire, and pipe rolling mills, as well as the German cast-iron pipe works. The chapter headings are: Die Darstellung des Eisens; Die Darstellung des Roheisens; Die Darstellung des schmiedbaren Eisens; Die Formgebungsarbeiten; Wirtschaftliche Bedeutung des Eisengewerbes; Anhang.

Gifts have also been received from the following:

Ala.—R. R. Comm. 1 vol.
Allen, W. F. 1 bound vol.
Am. Ceramic Soc. 1 vol.
Am. Electrochemical Soc. 1 bound vol.
Am. Inst. Elec. Engrs. 1 bound vol.
Am. Iron & Steel Assoc. 1 pam.
Am. Street Ry. Assoc. 2 vol.
Arango, R. M. 1 pam.
Architekten-Verein zu Berlin. 1 pam.
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DEATHS.

Bond, Frederick Winn	Elected Member. December 7th, 1898; died July 12th, 1903.
Dunham, Charles Frederick	Elected Member, April 2d, 1902; died June 13th, 1903.
Fteley, Alphonse	Elected Member, January 5th, 1876; died June 11th, 1903.
Hardy, George Richardson	Elected Member, November 7th, 1888; died April 2d, 1903.
Jones, Benjamin Franklin	Elected Fellow, June 13th, 1870; died May 19th, 1903.
Libby, Edmund Dorman	Elected Member, May 6th, 1885; died April 24th, 1903.
Martin, Charles Cyril	Elected Member July 10th, 1872; died July 11th, 1903.
Morison, George Shattuck	Elected Member, January 6th, 1875; died July 1st, 1903.
Morse, Henry Grant	Elected Member, April 7th, 1880; died June 2d, 1903.
Thompson, William George McNeill	Elected Member, July 2d, 1879; died May 12th, 1903.
Vanderpool, Eugene	Elected Member, September 2d, 1874; died July 12th, 1903.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(May 12th to Aug. 8th, 1903.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings*, Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
(7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine*, New York City, 25c.
(10) *Cassier's Magazine*, New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News*, New York City, 15c.
(14) *The Engineering Record*, New York City, 12c.
(15) *Railroad Gazette*, New York City, 10c.
(16) *Engineering and Mining Journal*, New York City, 15c.
(17) *Street Railway Journal*, New York City, 35c.
(18) *Railway and Engineering Review*, Chicago, Ill., 10c.
(19) *Scientific American Supplement*, New York City, 10c.
(20) *Iron Age*, New York City, 10c.
(21) *Railway Engineer*, London, England, 25c.
(22) *Iron and Coal Trades Review*, London, England, 25c.
(23) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal*, New York City, 10c.
(25) *American Engineer*, New York City, 20c.
(26) *Electrical Review*, London, England.
(27) *Electrical World and Engineer*, New York City, 10c.
(28) *Journal*, New England Water-Works Assoc., Boston, $1.
(29) *Journal*, Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
(31) *Annales de l' Assoc. des Ing. Sortis des École Spéciales de Gand*, Brussels, Belgium.
(32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
(33) *Le Génie Civil*, Paris, France.
(34) *Portefeuille Économique des Machines*, Paris, France.
(35) *Nouvelles Annales de la Construction*, Paris, France.
(36) *La Revue Technique*, Paris, France.
(37) *Revue de Mécanique*, Paris, France.
(38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
(39) *Railway Master Mechanic*, Chicago, Ill., 10c.
(40) *Railway Age*, Chicago, Ill., 10c.
(41) *Modern Machinery*, Chicago, Ill., 10c.
(42) *Transactions*, Am. Inst. Elec. Engrs., New York City, 50c.
(43) *Annales des Ponts et Chaussées*, Paris, France.
(44) *Journal*, Military Service Institution, Governor's Island, New York Harbor, 50c.
(45) *Mines and Minerals*, Scranton, Pa., 20c.
(46) *Scientific American*, New York City, 8c.
(47) *Mechanical Engineer*, Manchester, England.
(54) *Transactions*, Am. Soc. C. E., New York City, $5.
(55) *Transactions*, Am. Soc. M. E., New York City, $10.
(56) *Transactions*, Am. Inst. Min. Engrs., New York City, $5.
(57) *Colliery Guardian*, London, England.
(58) *Proceedings*, Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(59) *Transactions*, Mining Inst. of Scotland, London and Newcastle-upon-Tyne.
(60) *Municipal Engineering*, Indianapolis, Ind., 25c.
(61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburg, Pa.
(63) *Minutes of Proceedings*, Inst. C. E., London, England.
(64) *Power*, New York City, 20c.
(65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting*, London, England, 15c.
(67) *Cement and Engineering News*, Chicago, Ill., 25c.
(68) *Mining Journal*, London, England.

LIST OF ARTICLES.

Bridge.

The Rupnarayan Bridge, Bengal-Nagpur Railway. Stephen Martin-Leake, Assoc. M Inst. C. E. (63) Vol. cli.
Victoria Bridge over the Brisbane River, Brisbane, Queensland. Alfred Barton Brady, M. Inst. C. E. (63) Vol. cli.
Bridge Building and Bridge Works in the United States.* (12) Serial beginning Jan. 16.
Curves of Maximum Bending Moment.* Arthur L. Bell. (12) May 8.
The King Edward VII. Bridge at Kew.* (11) Serial beginning May 15.
The Polar Moment of Inertia, and Its Graphical Application to Riveted Joints.* C. F. Blake and R. W. Runge. (13) May 21.
Steel Underflooring and Wood Block Pavement for the Roadways of the Williamsburg Bridge.* (13) May 21.
Rail-Concrete Masonry on the New York, Ontario & Western.* (15) May 22.
Standard Plans for Bridges on the Atchison, Topeka & Santa Fé Ry.* (13) May 28.
New Vauxhall Bridge.* (12) Serial beginning May 29.
An Exhibit of Some Curious Lattice Trusses.* Geo. N. Linday. (4) June.
The Stresses on Skew Arches.* W. C. Kernot, M. Am. Soc. C. E. (Paper read before the Victorian Inst. of Engrs.) (13) June 11.
Reinforced Concrete Bridge over River Des Peres, Forest Park, St. Louis, Mo.* (13) June 11.
Bridges on the Eastern Illinois & St. Louis.* (15) June 12.
The Springville Bridge.* (14) June 13.
The Raritan River Stone Arch Bridge of the Pennsylvania R. R., at New Brunswick, N. J.* (13) June 18.
The Paderno Wrought-Iron Arch Viaduct.* (13) June 18.
Concrete Arch Bridge over the San Juan River on the Road from Santiago de Cuba to Caney.* Eduardo J. Chibas, M. Am. Soc. C. E. (13) June 18.
The Merits of Grillage on a Pile Foundation.* J. C. Hain. Paper read before Iowa Ry. Club.) (15) June 19.
Comparison of Eye-Bar Chains with Steel-Wire Cables for the Manhattan Bridge. (13) June 25; (14) June 27.
Wire Cables *versus* Eye-bar Chains for Suspension Bridges. Wilhelm Hildenbrand, M. Am. Soc. C. E. (14) July 4.
The Proposed Brooklyn Bridge Terminal and New York Municipal Building.* (13) July 9.
Scherzer Rolling-lift Plate Girder Railroad Bridges.* (14) July 11.
Pyrmont Bridge, Sydney, Australia.* John Plummer. (19) July 11.
Replacing a Suspension Bridge by a Masonry Arch.* (13) July 16.
A Concrete-Steel Three-Hinged Arch Bridge.* (13) July 18.
The Widening of London Bridge.* Harold J. Shepstone. (19) Aug. 1.
The Plattsmouth Bridge of the Burlington.* (15) Aug. 7.
Erection of Manhattan Valley Viaduct.* (14) Aug. 8; (20) July 30.
The Great Miami River Highway Bridge, Dayton, Ohio.* (14) Aug. 8.
Le Pont de Gignac sur l'Hérault, 1774–1810: Notice Descriptive et Historique. F. De Dartien. (43) 4e Trimestre, 1902.
Pont Suspendu Semi-Rigide de Vernaison (Rhone).* Ch. Dantin. (33) July 4.

Electrical.

High-Speed Electrical Generating-Plant. Thomas Herbert Minshall. (63) Vol. cli.
The Operation of Automatic Circuit-Breakers, and the Effects of Short Circuits on Dynamos. Bertram Hopkinson. (63) Vol. cli.
A System of Electric Lighting for Cars. James F. McElroy. (42) Apr.
Burning of Wooden Pins on High Tension Transmission Lines. C. C. Chesney. (42 Apr.
Transposition and Relative Location of Power and Telephone Wires. P. M. Lincoln. (42) Apr.
The Testing of Insulators. F. O. Blackwell. (42) Apr.
Mechanical Specifications of a Proposed Standard Insulator Pin. Ralph D. Mershon. (42) Apr.
Methods of Speed Control. William Cooper. (42) Apr.
Economical and Safe Limits in the Size of Central Stations. H. A. Lardner. (42) May.
Safety Devices in Central Stations and Substations. Philip Torchio. (42) May.
Multiple *versus* Independent Operation of Units and Central Stations. Peter Junkersfeld. (42) May.
The Manufacture of Incandescent Lamps.* (11) May 8.
Divided Multiple Switchboards: An Efficient Telephone System for the World's Capitals.* W. Aitken. (Abstract of paper read before the Inst. of Elec. Engrs.) (26) Serial beginning May 15.
The Crompton Potentiometer for Electrical Measurements with Direct Current Supply. (19) May 16.
Long-Distance High-Tension Transmission of Power in California.* Hamilton Wright. (46) May 16.
The New Electricity Works at Worcester.* (26) May 22.
Recent Development of the Chicago Edison and Commonwealth Electric Systems.* (27) May 23.

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* Illustrated.

Electrical—(Continued).

Development of Light and Power Business at Red Oak, Iowa.* (27) May 28.
The Pontiac Light and Water Co., Pontiac, Ill.* (27) May 28.
An Automatic Electric Lift.* (47) May 28.
Tests of Electric Driving Equipment in the Works of the Morden Frog & Crossing Co. Miles F. Moore. (13) May 28.
Estimates for an Electric Plant for Public Lighting in New York City. (13) May 28.
Electric Lighting of Aldershot Camp.* (26) May 29.
Electric Power and Lighting in the New Government Building at San Francisco.* (14) May 30.
Applications of Electricity in Vickers, Sons and Maxim's Works. A. D. Williamson. (Paper read before the Inst. of Elec. Engrs.) (22) Serial beginning May 15; (47) Serial beginning May 30.
The 25 000 Volt Transmission Plant of the South Bend Electric Company.* (27) May 30.
Great Electric Installations of Italy: The Hydro-Electric Station of Cenischa.* Enrico Bignami. (9) June.
The Electric Furnace.* (10) June.
The Progress in Wireless Telegraphy. William Maver, Jr. (10) June.
Electric Driving in Workshops. A. D. Williamson. (Paper read before the Inst. of Elec. Engrs.) (11) Serial beginning June 5; abstract (47) June 6.
Stassano Electric Furnace Steel Process.* (26) June 5.
The Insulation and Mechanical Protection of Electric Wiring. (26) June 5.
The Power Plant of the Neversink Light and Power Company.* (14) June 6.
Construction and Operation of a Freight Car Driven by Induction Motors.* A. B. Weeks. (17) June 6.
Railway and Lighting Storage Battery at Milwaukee.* (17) June 6; (27) June 13.
Modern English Power Plant.* (17) June 6.
Relative Advantages of Electrical and Mechanical Methods of Variable Speed Control for General Power Service. William Cooper. (Read before the National Elec. Light Assoc.) (18) June 6.
Ashtabula Telephone Exchange.* (27) June 6.
Commutator Losses. W. B. Hird. (Paper read before Glasgow Section, Inst. Elec. Engrs.) (47) June 6.
A Small Municipal Water and Electric Light Plant at Tullahoma, Tenn. (13) June 11.
The Development of the Current Interrupter. J. Wright. (26) Serial beginning June 12.
Rebuilding the Duluth General Electric Company's Station.* Clifford L. Higgins. (27) June 13.
Lifting Electromagnets.* D. A. Willey. (27) June 13.
The Cost of High Tension Lines. (17) June 20.
New Central Station of the Commonwealth Electric Company of Chicago.* (20) June 18.
High Tension Transformers. J. W. Farley. (Paper read before Canadian Electrical Assoc.) (62) June 18.
The Poplar Electricity Works.* (26) Serial beginning June 19.
Collins Wireless Telephone System.* T. Byard Collins. (27) June 20.
A Contribution to the Subject of Aging of Sheet Steel. Thomas S. Allen. (27) June 20.
The Gruhn Telechirograph for Transmission of Handwriting.* (27) June 20.
Loss by Electric Lighting Companies through Poor Meters and Transformers. (13) June 25.
The Development of Electric Station Power Plant. Elihu Thomson. (Paper read before National Elec. Light Assoc.) (20) June 25; abstract (13) June 4.
Electricity in the Shop. H. M. Phillips. (62) Serial beginning June 25.
The New Electricity Works of the Manchester Corporation.* (26) Serial beginning June 26.
Westinghouse Type F Induction Motor.* (40) June 26; (18) July 25.
A Note on Three-Phase Power Measurement. F. A. Fish. (27) June 27.
Electric Power from the Hudson.* Alton D. Adams. (27) June 27.
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Applications of Electricity to Agriculture.* Émile Guarini. (9) July.
Electrical Operation in Central Stations.* Howard W. Leitch. (64) July.
High-Pressure Steam Heating Transmission and Electric Lighting Plant at Dresden.* Franz Köster. (14) July 4.
Improvements at the Stephenson Works.* (17) July 4.
The Special Telephone System of the Manhattan Elevated Railway, New York City.* (27) July 4.
An Automatic Telephone Exchange for Chicago.* R. E. Sack. (27) July 4.
Composite System of Electrical Transmission and Distribution. Frederick Bedell. (Paper read before the Cleveland Electric Club.) (27) July 4; (24) July 13.
The Telechirograph—A New Facsimile Telegraph.* (46) July 4.
The Rand Central Electric Works.* (26) July 10.
Private Telephone System of the Manhattan Railway Company.* (17) July 11.
Some Recent Effects of Electrolytic Action upon Underground Mains and Other Metals.* A. A. Knudson. (Paper read before the Amer. Water-Works Assoc.) (24) July 13.
The Electric Plant at Tredegar.* (22) July 17.

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* Illustrated.

Electrical—(Continued).

Continuous and Alternating Currents Applied to Mining. Ellis H. Crapper. (22) July 17.
Compounded Asynchronous Machinery. G. Hooghwinkel, M. I. E. E. (26) Serial beginning July 17.
Utica Home Telephone Company's Exchange.* F. L. Martin. (27) July 18.
Surveys for Electrolysis and Their Results. D. H. Maury, M. Am. Soc. C. E. (Paper read before Amer. Water-Works Assoc.) (13) July 23.
On the Preservation of Instruments and Machinery in Bengal. Paul Bruhl. (Paper read before the Calcutta Section of the Inst. of Elec. Engrs.) (12) Serial beginning July 24.
Hertzian Wave Telegraphy.* J. A. Fleming. (29) Serial beginning July 24.
The Batault Electric Wattmeter for Simple Alternating and Polyphase Currents.* (19) July 25.
Electrostatic High-Pressure Voltmeter.* (47) July 25.
Defective Machine Insulation. C. E. Farrington. (3) Aug.
Care and Management of Electric Generators.* Edwin W. Creed. (64) Aug.
Electric Motors in an Iron Works.* (14) Aug. 1.
The Missouri River Power Station of the Metropolitan Street Railway Company, of Kansas City, Mo.* (17) Aug. 1.
An Electrically-Operated Coal Hoist.* Richard Lamb. (27) Aug. 1.
The Schuckert Electric Works at Nuremberg, Germany.* S. N. Taylor. (27) Aug. 1.
The Lodge-Muirhead System of Wireless Telegraphy.* A. Frederick Collins. (27) Aug. 1.
The Power Plant for the Metropolitan Street Railway of Paris.* Emile Guarini. (19) Aug. 8.
Effect of Series Resistance in the Primary Circuit of a Transformer.* H. A. Pikler. (27) Aug. 8.
Hydraulic-Electric Development of the Neversink Light and Power Company, Middletown, N. Y.* (27) Aug. 8.
Eccentricities of the Static Discharge.* Walton Harrison. (46) Aug. 8.
Applications de l'Électricité à la Distribution de la Force Motrice dans les Ateliers et les Diverses Exploitations Industrielles.* E. De Marchena. (32) May.
Applications du Rappel Bréguet-Rodary aux Communications Télégraphiques et Teléphoniques sur les Chemins de Fer de P.-L.-M.* Rodary. (38) June.
Usine Hydro-Électrique de Cauvery Falls (Inde).* F. Drouin. (33) July 25.

Marine.

Marine Installations for the Carriage of Refrigerated Cargoes.* R. Balfour. (Paper read before the Inst. of Naval Archts.) (11) May 8.
H. M. S. *Commonwealth*.* (12) May 22.
A Comparison of the German Battleship *Wettin* with the *Maine*.* Fred. T. Jane. (46) June 13.
Performance of Babcock & Wilcox Boilers in a Gunboat. Henry C. Dinger. (Reprinted from the *Journal* of the Amer. Soc. of Naval Engrs.) (47) June 20.
The 120-Ton Floating Derrick for the Norfolk Navy Yard.* (13) June 25.
Coaling Warships at Sea.* Herbert C. Fyfe. (46) June 27.
The Auxiliary Machinery of Steam Vessels.* Jasper E. Cooper. (10) Serial beginning July.
The *Kaiser Wilhelm II:* The Newest and Largest Atlantic Liner.* Gustav H. Schwab. (10) July.
On Mercantile Cruisers Fitted with Housing Propellers.* James Hamilton. (Paper read before the Inst. of Naval Archts.) (11) July 3.
Channel Steamship *The Queen*. (12) July 3.
T.—S. S. *Kaiser Wilhelm II*.* (11) July 10.
Cross-Channel Steamers. J. H. Biles. (Paper read before the Inst. of Naval Archts.) (11) July 10.
The Steam Turbine and Its Application to the Propulsion of Vessels.* C. A. Parsons. (Paper read before the Inst. of Naval Archts.) (11) Serial beginning July 10.
A 6 000-Ton Floating Depositing Pontoon Dock.* (46) July 11.
Fast Coaling Ships for Our Navy.* E. H. Tennyson D'Eyncourt. (Paper read before the Inst. of Naval Archts.) (11) July 17.
The Clyde and Naval Work. (12) Serial beginning July 17.
The New Graving Dock of the Kawasaki Dockyard Company, Kobe.* (11) July 24.
The Griffin Marine Type Hydro-Oil Engines.* (11) July 24.
The New York Shipbuilding Company's Plant, Camden, N. J.; Pt. II.* (14) July 25.
Development in Floating Dry-Docks.* Joseph J. Shultz. (9) Aug.
Modern American Launch Motors.* W. P. Stephens. (10) Aug.
De l'Emploi des Moteurs à Pétrole à Bord des Bateaux de Pêche.* J. Pérard. (32). Mar.

Mechanical.

Mechanical Stokers.* Edwin Fitts. (58) Apr.
Commercial Gases for Power Purposes. Alexander M. Gow. (58) May.
Power and Economy of the Gas Engine as Influenced by the Fuel. Wm. P. Flint. (58) May.

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Mechanical—(Continued).

Coal-Handling Machinery and Its Application to Steam Power Plants.* T. F. Webster (58) May.

Utilizing Water Gas in the Production of Illuminating and Heating Gases. William Young. (66) May 5.

The Construction and Working of Machine Reamers and Reaming Heads.* (11) Serial beginning May 8.

The Wilskemp Smoke Consumer.* (12) May 8.

Dunlop's Reversible Self-Starting Internal Combustion Engines.* (47) May 9.

Retort Stoking by Electricity.* (66) May 12.

A Small "Home-Made" Dipper Dredge or Steam Shovel.* (13) May 14.

A New Pneumatic Hammer.* (13) May 14.

Power Plant of the Government Printing Office at Washington.* (14) Serial beginning May 16.

A Cold Storage Warehouse.* (14) May 16.

The Serpollet Steam Automobile.* (19) Serial beginning May 16.

Water in Steam. James Andrew. (Paper read before the Glasgow Technical College Soc.) (47) Serial beginning May 16.

The Choice of a Steam Boiler. C. E. Stromeyer. (Paper read before the Civil and Mech. Engrs. Soc.) (47) May 16.

The Dellwik-Fleischer Process of Carburetting Water Gas by Passing It Into Retorts. M. Leconte. (Abstract of paper read before the Société Technique du Gaz en France.) (66) Serial beginning May 19.

Two Experiments in Smoke Preventing Furnaces.* (13) May 21.

Gas-Driven Blowing Engine (Delamere-Deboutteville & Cockerill System).* (11) May 22.

Blast Furnace Gas Engines and Steam Engines. (11) May 22.

Milling Machine Methods.* (12) May 22.

The Curtis Steam Turbine.* (27) May 23; (14) July 11.

The New Parisian Retort Charging-Machine and Discharging-Ram.* (66) May 26.

The Present and Future of the Hastings Gas-Works.* (60) May 26.

Reducing Breakage in Coal Shipping.* (13) May 28.

Some Present Requirements in Laundry Machinery.* Henry Waring. (11) May 29.

Continental Engine Construction. (12) Serial beginning May 29.

The Expansion, Separation and Compression of Wet Steam. Robert H. Smith. (12) May 29.

Friction in Gas Engines. H. E. Thompson. (Paper reprinted from the *Proceedings* of the Soc. of Mech. Engrs. of Cornell Univ.) (47) May 30.

Sulphur-Dioxide and the Binary Engine. R. H. Thurston. (3) June.

Practical Liquid Air Possibilities for Refrigeration and Power.* Carl von Linde. (10) June.

The Equipment of Machine Shops.* Joseph Horner. (10) June.

Lignite Burning in Locomotives, Burlington & Missouri River Railroad: Analysis of Smokebox Gases. M. H. Wickhorst. (25) June.

Group Driving of Machine Tools. J. C. Steen. (25) June.

Motor Driven Machine Tools: Examples of Individual Drives Applied to Boring Mills.* (25) June.

Comparative Tests of California Crude Oils; Atchison, Topeka & Santa Fé Railway. (25) June.

Power Test of Group Drive Motors: Records of Power Required for the Group Drives at the Roanoke Shops, Norfolk & Western Railway. (25) June.

The Proportions of Modern Locomotives. Lawford H. Fry. (25) June.

Fuel: What We Don't Know About It. Edward Atkinson. (28) June.

Lubricants for Cylinders. R. T. Strohm. (45) June.

The Bellevue Washery of the D., L. & W. R. R. Co., Scranton, Pa.* (45) June.

The Ostergren Oil Engine.* (64) June; (14) June 6; (46) June 6; (62) June 25.

Tests of Superheated Steam.* M. Schroter. (64) June.

The Condensing Plant of the New York Rapid Transit Power House.* (64) June.

Report of the Committee Appointed by the Ohio Gas Light Association to Determine Standard Methods of Testing Fuel Gas Appliances.* (24) Serial beginning June 1.

The Heisler Compensating Gear for Direct Acting Pumping Engines.* (13) June 4.

A Circular Storage System for 50 000 Tons of Coal.* (20) June 4.

Springs and Their Use.* Ivar Kirkegaard. (20) June 4.

The Reid Ball Bearings.* (20) June 4.

Exhaust-Steam Turbines. (11) June 5.

Relative Advantages of Electrical and Mechanical Methods of Variable Speed Control for General Power Service. William Cooper. (Read before the National Elec. Light Assoc.) (18) June 6.

A New Apparatus for Determining the Resistance of Road Vehicles to Traction.* (46) June 6.

The Self-Carburetting of Water Gas in Gas-Works. (66) June 9.

Burning Illinois Coal without Smoke. L. P. Breckenridge, M. Am. Soc. M. E. (Paper read before the Commercial Club of Chicago.) (13) June 11.

Tests of the Efficiency of Hoisting Tackle. S. L. Wonson. (13) June 11.

Some Tests of Boiler and Furnace Efficiencies.* A. Bement. (Extract of paper read before National Elec. Light Assoc.) (13) June 11.

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Mechanical—(Continued).

The Inefficiency of the Ordinary Lathe for High Speed Cutting. H. M. Norris. (Paper read before the Cincinnati Metal Trades Assoc.) (20) June 11.
A New Charcoal Cooling Process. Bernhard Zwillinger. (20) June 11.
Comparative Test of Beehive and Retort Coal. E. A. Uehling. (20) June 11.
The Kynoch-Fornard Oil-Engine.* (11) June 12.
Britannia Steel Works, Middlesbrough.* (11) Serial beginning June 12.
The Nuremberg Double-Acting Tandem Gas Engines.* (22) June 12.
The Bauer Coke Oven.* (57) June 12.
The Stress on Bolts in Service. John H. Barr. (Reprinted from Sibley Journal of Engineering.) (47) June 13.
Maximum Economical Yield of Gas per Pound of Coal Carbonized. John Somerville. (24) June 15.
Candles and Calories. Vivian B. Lewes. (Lecture delivered before Inst. of Gas Engrs.) (66) June 16.
Photometry and Testing. Walter Grafton. (Paper read before the Inst. of Gas Engrs.) (66) June 16.
The Lewes Process at Tipton.* Sidney O. Stephenson. (66) June 16.
The "Selas" System of Intensified Gas Lighting by Means of an Admixture of Gas and Air.* F. D. Marshall. (Paper read before the Inst. of Gas Engrs.) (66) June 16.
Later Developments in High-Pressure Lighting.* A. W. Onslow. (Paper read before the Inst. of Gas Engrs.) (66) June 16.
Molding Machines of the "Squeezer" or Hand Press Type.* S. H. Stupakoff. (Abstract of paper read before Amer. Foundrymen's Assoc.) (13) June 18.
Friction and Lubrication. J. Stormouth. (12) June 19.
Applying a Motor Drive to an Old Lathe.* (15) June 18.
Penwyllt Haulage.* (58) June 19.
Progress in Machine Tools.* (18) Serial beginning June 20.
Butler's 5 000 H.-P. 3-Cylinder Double-Acting Compound Gas Engine.* (47) June 20.
Naphthaline. W. H. Birchmore. (Address before Western Gas Assoc.) (24) Serial beginning June 22.
High-Pressure Gas Incandescent Lighting.* William Sugg. (Paper read before the Inst. of Gas Engrs.) (66) June 23; (14) June 27.
The 120-Ton Floating Derrick for the Norfolk Navy Yard.* (13) June 25.
The Moore Vertical Water Tube Boiler.* (20) June 25.
The New Semet-Solvay Coke Oven.* (22) June 26.
The New Shops of the American Locomotive Company at Schenectady.* Lindsay Duncan. (14) June 27.
From Siding to Coke-Store at the Bury Gas-Works.* (66) June 30.
Acetylene Stored and Transported in Safety. John S. Seymour. (3) July.
Liquid Fuel for Power Purposes. Arthur L. Williston. (9) Serial beginning July.
The Auxiliary Machinery of Steam Vessels.* Jasper E. Cooper. (10) Serial beginning July.
Milling as a Method of Machining; Its Development in American Shop Practice.* Charles S. Gingrich. (10) July.
High Pressure Steam Piping. William Andrews. (Paper read before the Engine Builders' Assoc.) (64) July.
Graphical Chart for the Solution of Valve Gear Problems. W. F. Durand. (64) July.
Rope Transmission of Power. D. B. Dixon. (62) July 2.
The Automobile Congress at Paris. (12) Serial beginning July 3.
Improvements at the Stephenson Works.* (17) July 4.
Warren Rotary Engine.* (27) July 4; (20) July 9; (14) June 27.
The Capabilities of High-Speed Steel. Wm. Lodge. (Paper read before Amer. Foundrymen's Assoc.) (47) July 4.
Heat Conductivity of Gas Retorts.* H. A. Wheeler. (Paper read before the Western Gas Assoc) (24) July 6.
Quadrupling the Capacity of an Ordinary Purifier House at Very Small Cost.* F. H. Shelton. (Paper read before the Western Gas Assoc.) (24) July 6.
The Old and the New at Shrewsbury (Gas Works).* (66) July 7.
The Buhlmann System of Burning-Off, Shaping, and Seasoning Mantles.* (66) July 7.
A New Molding Press for Making Cement Pipe.* (13) July 9.
Springs and Spring Steel. William Metcalf. (Paper read before Amer. Soc. for Testing Materials.) (20) July 9; (13) July 30.
The Manufacture of Armour-Plate Bolts.* (11) July 10.
Some New Types of Superheaters.* W. H. Watkinson. (Paper read before the Inst. of Naval Archts.) (11) July 10; (12) July 17; abstract (47) Serial beginning July 11.
A New Theory of Heat Power Plants. Robert H. Smith. (12) Serial beginning July 10.
Automatic Wheel-Cutting Machine.* (12) July 10.
An Improved System of Engine Stops.* (19) July 11.
Radial Drilling Machines.* Thomas R. Shaw. (47) Serial beginning July 11.
Practical Belt Driving. John Tullis. (Abstract of paper read before the Aberdeen Mech. Soc.) (47) July 11.
A Comparison between the First Cost of Inclined and Horizontal Retorts. Frère. (Paper read before the Société Technique du Gaz.) (66) July 14.
The Universal Pipe and Fittings.* (20) July 16.
Condensing Plant for Central Electric Stations. R. D. Summerfield. (11) Serial beginning July 17.

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Mechanical—(Continued).

Cranes on Dover Pier.* (12) July 17.
Steam Autocar Notes.* (12) July 17.
Cylinder Oil and Cylinder Lubrication. Henry M. Wells. (12) Serial beginning July 17.
Air and Gas Mixtures, Explosion Pressures, and Cylinder Proportions of Gas Engines. James Dunlop. (47) July 18.
Sulphate of Ammonia Making by a New Process.* J. Ballantyne. (Paper read before the Inst. of Gas Engrs.) (24) July 20.
Water Gas Manufacture by the Kramers and Aarts Process. (66) July 21.
Portable Pneumatic Revolving Cranes.* (13) July 23.
The Plant of the Hudson Portland Cement Co., at Hudson, N. Y.* (13) July 23.
French Tests of Alcohol Motors. C. C. Longridge, M. I. Mech. E. (12) July 24.
Coal Washing and Screening Plants.* (22) July 24.
The Mechanical Plant of a Columbia, S. C., Office Building.* (14) July 25.
The Operation of the Rateau Steam Turbine. (17) July 25.
The Inefficiency of the Standard Lathe for High-Speed Cutting. H. M. Norris. (Paper read before Amer. Foundrymen's Assoc.) (18) July 25.
The Rateau Steam Turbine.* (27) July 25.
The Management and Working of Boilers.* Horace Boot. (Abstract of paper read before Incorporated Mun. Elec. Assoc.) (47) July 25.
A Machine for Sorting and Washing Pan-Breeze.* (24) July 27.
A German Installation of West's Retort-Stoking Machinery. (66) July 28.
Fuel Oil. John F. Rowland, Jr. (3) Aug.
The Utilization of Blast-Furnace Gases for Power Purposes. Charles Kirchhoff. (3) Aug.
Natural Sources of Energy; the Probable Extensive Development of Solar Power.* Louis Bell. (10) Aug.
Feed-Water Heaters; Examples from Current American Practice.* William Wallace Christie. (10) Aug.
Modern American Launch Motors.* W. P. Stephens. (10) Aug.
Motor-Driven Machine Tools; the Latest Practice in Applying Individual Drives to Shapers.* (25) Aug.
Woodworking Machinery; Important Developments in Individual Driving by Electric Motors.* (25) Aug.
Beehive Coke Ovens.* (45) Aug.
The Reorganization of the Condensing System of the Manhattan Station.* (64) Aug.
Coal and Oil Fuel Compared. George E. Walsh. (64) Aug.
The Westinghouse Vertical Marine Type Engine.* (64) Aug.
Burning Powdered Coal Under Boilers.* (64) Aug.
A Small Ice Plant at Columbia, S. C.* (14) Aug. 1.
Improvements in Steam Shovels.* Waldon Fawcett. (46) Aug. 1.
The Ore-Carrying Wire Ropeway at Vivero, Spain.* (46) Aug. 1.
Loss of Illuminating Power of Mantles while Burning.* Alfred H. White and M. E. Mueller. (Paper read before the Michigan Gas Assoc.) (24) Aug. 3.
A New Trench Digging Machine.* (13) Aug. 6.
Metallic Packings; Principles of Design Essential for Successful Development. Charles Longstreth, Assoc. Am. Soc. Naval Engrs. (Reprinted from the *Journal* of the Amer. Soc. of Naval Engrs.) (13) Aug. 6.
Note sur les Cables Témoins: Sytème F. Arnodin. F. Arnodin. (32) Mar.
Moteur à Gaz et à Récupération des Calories Actuellement Perdues. Jules Garniér. (32) Mar.
Quelques Progrès Récemment Réalisés dans les Machines à Vapeur.* P. Arrachart. (32) Apr.
Contribution à l'Étude du Fonctionnement Mécanique des Machines Alternatives. R. Lelong. (37) Serial beginning May.
Conditions de Résistance des Pistons des Machines à Vapeur. Codron. (37) Serial beginning May.
Le Moteur Alterno-Rotatif Primat.* (36) May 10.
Equilibrage des Machines.* H. Brillié. (33) Serial beginning May 23.
La Turbine à Vapeur.* Raucour. (36) May 25.
Les Forces Motrices dans les Régions sans Eau et sans Charbon et en Particulier aux Colonies.* A. Lombard. (36) May 25.
Les Condensations Centrales à l'Exposition de Düsseldorf.* P. F. Dujardin. (33) May 30.
Transport par Hélices à 200 Mètres de Distance.* (33) May 30.
Méthode de Calcul des Arbres Chargés Animés de Grandes Vitesses de Rotation. Delaporte. (37) June.
L'Utilisation des Gaz de Hauts Fourneaux. S. Marsolan. (36) June 10.
Le Ballon *Lebaudy*.* G. Espitallier. (33) June 13.
Fabrique de Cellulose et de Papier à Rumford Falls (Etats-Unis).* (33) June 13.
Protection contre le Saut de la Navette dans les Métiers à Tisser.* Henri Marny. (33) Serial beginning June 13.
Transmissions de Mouvement par Courroies ou Cables Enrouleur-Débrayeur du Capitaine Leneveu.* Ch. Dantin. (33) June 20.
Les Nouveaux Appareils d'Eclairage au Gaz par Incandescence.* H. Guérin. (33) June 27.

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Mechanical—(Continued).

Les Turbines à Vapeur.* A. Abraham. (36) Serial beginning July 10.
L'Alcool Considéré Comme Combustible. Edmond Brunet. (36) Serial beginning July 10.
L'Acétylène Dissons et Ses Principales Applications.* A. Janet. (33) July 18.
État Actuel de la Théorie de la Surchauffe de la Vapeur. Hermann Bernard. (33) July 25.

Metallurgical.

The Evolution of the Determination of Iron in Ores. Harrison W. Craver. (58) May.
The Open-Hearth Process. Leandro Cubillo. (22) May 8.
The Application of the Electrical Furnace in Metallurgy.* Albert Keller. (22) May 8; abstract (47) June 13.
The Effect of Flue Dust upon the Thermal Efficiency of Hot Blast Stoves. B. H. Thwaite. (Paper read before the Iron and Steel Inst.) (22) May 8.
The Development of the Continuous Open-Hearth Process. Benjamin Talbot. (Paper read before the Iron and Steel Inst.) (22) May 8; (20) May 14; (11) May 15; (68) May 16; (62) June 4; (49) June 27.
A New Blast Furnace Top.* Axel Sahlin. (Paper read before the Iron and Steel Inst.) (22) May 8; (20) May 14; (11) May 29; (47) June 6.
The Works and Operations of the North-Eastern Steel Company, Middlesbrough-on-Tees.* (22) May 15.
Electrolytic Zinc Extraction by the Hoepfner Process.* E. Guenther. (16) May 16.
Strength of White-Iron Castings as Influenced by Heat Treatment. A. E. Outerbridge, Jr. (Paper read before Amer. Soc. for Testing Materials.) (13) May 21.
The Quality of Pig Iron for Foundry Use as Shown by Fracture and Analysis. S. B. Patterson. (Paper read before the New England Foundrymen's Assoc.) (20) May 21.
The Meune Process for Removing Metallic Obstructions.* (20) May 21.
Smelting at Mt. Lyell, Tasmania.* (16) May 30.
The Works of the Lackawanna Steel Company.* (14) Serial beginning May 30.
Influence of Casting Temperature on Properties of Alloys. Percy Longmuir. (Abstract of paper read before the Iron and Steel Inst.) (47) May 31.
Pig-Iron Casting and Conveying Machinery; Its Development in the United States.* E. A. Uehling. (10) June.
The Advantages of Machine-Cast Pig-Iron. Albert Ladd Colby. (10) June.
Stassano Electric Furnace Steel Process.* (26) June 5.
A Proposed Process for Extracting Copper from Low-Grade Ores. G. D. Van Arsdale. (16) June 6.
Treatment of Low Grade Copper Ores. Edward D. Peters. (16) June 6.
Malleable Cast Iron. Richard Moldenke. (Paper read before the Amer. Foundrymen's Assoc.) (20) June 11; (13) June 11; (62) June 25; (22) July 24.
Blast Furnace Conditions Affecting the Chemical Composition of Foundry Iron. W. Walley Davis. (Abstract of paper read before the Amer. Foundrymen's Assoc.) (20) June 11.
A Point in Concentration. M. A. Knapp. (16) June 20.
Cyaniding in Montana. Matt. W. Alderson. (45) July.
A Study of Alloys Suitable for Bearing Purposes.* G. H. Clamer. (3) July.
The Physical Properties of Malleable Castings as Influenced by the Process of Manufacture. Richard Moldenke, M. Am. Soc. M. E. (Paper read before Amer. Soc. for Testing Materials.) (13) July 9; (47) July 4.
Springs and Spring Steel. William Metcalf. (Paper read before Amer. Soc. for Testing Materials.) (20) July 9; (13) July 30.
On Adobe and Other Makeshift Furnaces.* Henry F. Collins. (Abstract from *Proceedings* of the Inst. of Min. and Metal.) (16) Serial beginning July 11.
The Casting of Pipeless Ingots by the Sauveur Overflow Method.* Albert Sauveur and Jasper Whiting. (Paper read before Amer. Soc. for Testing Materials.) (20) July 16.
The Swedish Lancashire Iron. Birger F. Burger. (20) July 16.
Note on the Alleged Cementation of Iron by Silicon. J. E. Stead. (Paper read before the Iron and Steel Inst.) (11) July 17.
The Cyaniding of Some Silver Ores by Percolation. Andre P. Griffiths and Frank W. Oldfield. (Abstract from *Proceedings* of the Inst. of Min. and Metal.) (16) July 18.
New Valves for Regenerative Furnaces.* (20) July 23.
Temperature Reactions in the Blast Furnace. Horace Allen. (12) July 24.
The Elmore Oil-Concentration Plant. Arthur W. Sancton. (45) Aug.
Fuel Briquetting. (45) Aug.
An Introduction to the Study of Alloys.* Henry M. Howe. (9) Aug.
The Treatment of Broken Hill Sulphides. Alec A. Readle. (16) Aug. 8.
L'Acier Thomas et Sa Fabrication.* A. de Riva-Berni. (34) Serial beginning June.
Nouvelles Récherches sur les Aciers au Nickel. Léon Guillet. (33) June 27.
Affinage de la Fonte par le Procédé Talbot: Nouvelles Applications de ce Procédé. (33) July 4.
Fabrication des Essieux en Acier Comprimé.* (33) July 11.

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Military.

The Theory and Practice of Armour Attack. (12) July 17.
Smokeless Powders; Their History and Present Classification. (19) July 25.

Mining.

Roads for Mines.* James W. Abbott. (16) Serial beginning May 16.
An Automatic Mine Car Tipple.* (13) May 21.
Electricity in French Slate Quarries.* (11) May 22.
Electric Ore-Finding System. Edward Skewes. (16) May 23.
Flume Construction.* W. C. Ralston. (Paper read before the California Miners' Assoc.) (16) May 23.
Method of Removing Overburden at the New Brothers Home No. 1 Tin Mine, Tasmania.* James B. Lewis. (16) May 30.
The Chain and the Pick Machines: A Comparison of the Two Types Coal Cutters from the Standpoint of an Advocate of Chain Machines.* H. S. Johnson. (45) June.
Peculiar Mines and Ore Deposits of the Rosita and Silver Cliff Mining District of Colorado.* A. M. Welles and Arthur Lakes. (45) June.
Sinking by the Freezing Method and Its Difficulties. (22) June 5.
On Coal-Cutting by Machinery. Owen Hughes. (Paper read before the Manchester Geological and Mining Soc.) (22) June 5; (57) Serial beginning June 12.
Observations on Gold Deposits. Chester Wells Purington. (16) Serial beginning June 6.
Methods and Values on the Yukon.* John D. McGillivray. (16) June 13.
Test Drilling on the Mesabi Iron Range.* Kirby Thomas. (16) June 13.
Electrical Apparatus in Coal Mining. S. B. Belden. (27) June 20.
Dusty Shots as a Factor in Coal Dust Explosions. Henry S. Munroe. (16) June 27.
The Gold-Bearing Gravels of Alaska.* John D. McGillivray. (9) July.
The Geology of Minnesota. C. W. Hall. (45) July.
Mining in South Africa. J. H. Curle. (16) Serial beginning July 11.
The Bottom Levels at Cripple Creek. Geo. J. Bancroft. (16) July 18.
Gold Pan Mining Plant at Breckenridge, Colo.* (27) July 18.
Discovery and History of the Witwatersrand Gold Fields. H. H. Webb. (Abstract of paper read before the South African Assoc. of Engrs.) (68) Serial beginning July 25.
Transverse Winding Engines for Deep Shafts.* H. M. Morgans. (Paper read before the Inst. of Min. and Metal.) (68) Serial beginning July 25.
Prospecting and Valuing Dredging Ground with a Well-Driller at Oroville, Cal. Newton Booth Knox. (Paper read before Inst. of Min. and Metal.) (13) July 30.
Electric Power Appliances in the Mines of Europe.* Émile Guarini. (9) Aug.
Safety Mining Lamps.* Rufus J. Foster. (3) Aug.
Water in the Mines of Cripple Creek.* Victor G. Hills. (16) Aug. 8.
L'Exploitation des Carrières aux États-Unis. A. De Gennes. (32) Mar.
Haveuses Mécaniques Employées dans les Mines de Houille.* J. Rosset. (33) Serial beginning July 4.

Miscellaneous.

Weights and Measures. S. W. Stratton. (58) Mar.
The Organization of Manufacturing Industries. Andrew Carnegie. (Extracts from Presidential address before Iron and Steel Inst.) (13) May 14; (22) May 8.
The Rockslide at Frank, Alberta.* Wm. Pearce. (13) June 4.
The Effect of Design on Methods of Construction from a Contractor's Point of View. R. W. Newman, Assoc. M. Inst. C. E. (Paper read before the Junior Inst. C. E.) (12) Serial beginning June 5.
The Training of the Civil Engineer. Geo. F. Swain, M. Am. Soc. C. E. (Extracts from article in *N. Y. Tribune.*) (15) June 12.
The Cause of the Cementing Value of Rock Powders. Allerton S. Cushman. (Abstract of paper in the *Journal* of the Amer. Chem. Soc.) (14) June 18.
The Subsidence of the Land and of the Harbor Bottom at Boston. (13) June 18.
The Making of Specifications. Chas. B. Dudley. (Presidential address delivered before Amer. Soc. for Testing Materials.) (13) July 9; (14) July 18; (20) July 9; (24) Serial beginning July 20.
The Heppner Disaster. John T. Whistler, Assoc. M. Am. Soc. C. E. (13) July 16.
Land Subsidence at Boston and the Reliability of Level Datum Planes. (14) July 18.
Lunette Pyrométrique à Réticule Thermo-Électrique.* Ch. Féry. (33) May 30.
Le Laboratoire d'Essais du Conservatoire des Arts et Métiers.* A. Dumas. (33) July 11.

Municipal.

The Construction of a Mountain Road in Cyprus. Edward Hugh Dyneley Nicolls, Assoc. M. Inst. C. E. (63) Vol. cli.
The Economic Construction and Maintenance of Roads in the Island of Cyprus. Charles Vincent Bellamy, M. Inst. C. E. (63) Vol. cli.
Asphalt Pavement and Street Railway Tracks.* W. Boardman Reed. (17) May 23.
The High Pressure Gas Main under the Mississippi River at New Orleans.* Thomas D. Miller. (Paper read before the Western Gas Assoc.) (24) June 8.
Brick Paving in Iowa. (14) June 18.

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Cost of Brick Pavements in Champaign, Ill. Charles Apple. (Reprinted from *The Technograph*.) (13) June 18.
Improved Streets and Their Repairs. W. F. Raymond. (60) July.
Concrete Culverts. A. W. Campbell. (Paper read before the Eng. Soc. of the Toronto School of Practical Science.) (67) July.
Sidewalk Building and Sidewalk Grades in Small Towns. Ernest McCullough. (13) July 9.
The Testing of Bitumens for Paving Purposes. A. W. Dow. (Abstract of paper read before the Amer. Soc. for Testing Materials.) (14) July 11; (13) July 23.
Notes on Some Moderate Cost Roads.* William G. Raymond. (14) July 18.
The United States Road Material Laboratory.* Logan Waller Page and Allerton S. Cushman. (Paper read before the Amer. Soc. for Testing Materials.) (14) Serial beginning July 25.
The Back Filling of Trenches. W. F. Raymond. (60) Aug.
The Grand Boulevard and Concourse, New York City.* (14) Aug. 8.
Question d'Édilité Parisienne.* Ch. de Tavernier. (36) July 10.

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The Limmat Valley Electric Road Railway. Charles Sheibner du Riche Preller, Assoc. M. Inst. C. E. (63) Vol. cli.
Railroad Repair Shop Design and Equipment.* George A. Damon. (61) Apr.
The Use of Timber by Railroads and Its Relation to Forestry. Hermann von Schrenk. (65) Apr.
Railroad Interest in Forest Supplies. B. E. Fernow. (65) Apr.
Injectors as They Are Met With in Every Day Railway Practice. F. W. Edwards. (61) May.
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Suburban Locomotive Development.* (15) May 15.
Metal Ties in Germany.* (15) May 15.
A New Electric-Motor Signal.* (15) May 15.
Water for Locomotive Boilers. William M. Jewell. (15) May 15.
The Appleyard Syndicate's Interurban System.* (17) Serial beginning May 16.
Tandem Compound for the New York Central.* (40) May 15.
New DeWitt Roundhouse of N. Y. C. & H. R. R. R.* (18) May 16.
Valtellina 20 000 Volt Three-Phase Electric Railway in Italy.* (18) May 16.
The Electrification of the Mersey Railway.* (47) May 16.
Location and Construction of the Ohio Residency, Pittsburg, Carnegie & Western R. R.* (13) May 21.
A New Automatic Buffer Coupling.* Charles Rous-Marten. (12) May 22.
The Sonder Steel Coke Car.* (40) May 22.
Temperature Tests of Injected Water (Locomotives).* H. M. Wickhorst. (40) May 22.
Switching Locomotives, Pittsburg, Shawmut & Northern Railroad.* (40) May 22.
New Passenger Locomotives for the Chicago & Alton Ry.* (13) May 28.
The Valtellina Electric Railway. Émile Guarini. (40) May 29.
Steam Distribution of the Vauclain Compound Locomotive.* Lawford H. Fry. (From the Baldwin Locomotive Works' "Record of Recent Construction," No. 42.) (15) May 29.
The Three-Phase Railway at Valtellina.* (17) May 30 .
The Proposed Terminal at St. George, Staten Island.* (17) May 30.
Six-Coupled Bogie Express Engine (Class 4-6-0); Great Western Railway.* (21) June.
Leaky Flues and Circulation in Wide Firebox Locomotives. John Player. (25) June.
Lignite Burning in Locomotives, Burlington & Missouri River Railroad: Analysis of Smokebox Gases. M. H. Wickhorst. (25) June.
Steel-Frame, Side-Door, Suburban Passenger Cars; Illinois Central Railroad.* (25) June.
Steel Frames for Cars: A Steel Frame Box Car.* C. A. Seley. (25) June.
Compound Passenger Locomotives, 4-4-2 Type; Vauclain Four-Cylinder Balanced System, Atchison, Topeka & Santa Fé Railway.* (25) June.
Steel Underframes and Steel Cars. (25) June.
New Roundhouse of the Baltimore & Ohio Railway.* (39) June.
Freight Locomotives of the Kansas City Southern Railway.* (39) June.
Line Changes on the Rio Grande Western Ry , in Utah.* W. P. Hardesty. (13) June 4.
Electro-Pneumatic Interlocking Plant. (11) June 5.
Clayton's Fog-Signalling Apparatus.* (11) June 5.
Eight-Wheeled Coupled Compound Locomotive for the Mediterranean Railway Company, Italy.* (11) June 5.
The Hall Electro Gas Signal.* (15) June 5.
Electrical Installation for Suburban Traffic on the North Eastern.* (15) June 5.
Superheated Steam in Locomotive Service. (15) Serial beginning June 5.
Compound Consolidation Locomotive for the Southern Pacific.* (40) June 5.
Maintenance of Boilers and Roundhouse Work. Reynold C Young. (Presented in Columbus Convention, International Ry. Master Boilermakers' Assoc.) (18) June 6.
New Electric Railroad from Paris to Versailles.* (19) June 6.
Gillmor's Automatic Switch Lock.* (15) June 12.
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The Symington Dust Guard.* (15) June 26.
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The Schoen Solid Forged and Rolled Steel Wheel.* (18) June 27.
The Automobile and the Railway as Transport Agents. Sylvester Stewart. (9) July.
The Design of Permanent Way and Locomotives for High Speeds. J. C. Inglis, M. Inst. C. E (Read at the Engineering Conference, London.) (21) July.
15-Ton Bogie Fish Wagons: Great Central Ry.* (21) July.
The Van Dyke Tank Wagon.* (21) July.
Siemens' Electric Governing Gear for Pneumatic Brakes.* (21) July.
Express Passenger Engine "Atlantic Class": Great Northern Railway.* (21) July.
Boiler with Belpaire Fire-Box and Coned Barrel: Great Western Railway.* (21) July.
American Railway Master Mechanics Association: Abstracts of Committee Reports.* (39) July.
Master Car Builders' Association: Abstracts of Committee Reports. (39) July.
The Rolling and Structure of Steel Rails. P. H. Dudley. (Report to W. J. Wilgus, Fifth Vice-President, N. Y. C. & H. R. R. R.) (62) Serial beginning July 2.
Heavy Special Type Passenger Locomotive.* (12) July 3.
The Norfolk & Western Railroad.* Geo. L. Fowler. (15) Serial beginning July 3.
The Seasoning of Tie Timber.* Hermann von Schrenk. (Bureau of Forestry Bulletin.) (15) Serial beginning July 3.
Boston & Maine's Latest Passenger Equipment.* (40) July 3.
Automatic Signal Protection for Milwaukee Passenger Station, Chicago, Milwaukee & St. Paul Railway.* (40) July 3.
Methods for Winter Railway Location and Construction.* E. H. Drury. (14) July 4.
The Electrification of British Railways.* (17) July 4.
Recent Improvements in Boiler Design.* (Abstract of report of Committee to Ry. Master Mechanics' Assoc.) (18) July 4; (47) July 18.
Steam and Air Line Connections. (Report of Committee to Master Car Builders' Assoc.) (18) July 4.
Standard Requirements for High-Speed Foundation Brake Gear for Passenger Service.* (Report of Committee to Master Car Builders' Assoc.) (18) July 4; (25) Aug.
Consolidation Locomotive for Southern Railway.* (18) July 4.
Collarless Journals. (Report of Committee to Master Car Builders' Assoc.) (18) July 4.
Government Ownership of Railways. H. R. Meyer. (40) Serial beginning July 10.
Ten-Wheel Compound Locomotive for the Chicago & Eastern Illinois.* (40) July 10.
Tank Cars.* (Report of Committee of Master Car Builders' Assoc.) (40) July 10.
Report of Committee to Master Mechanics' Assoc.: Piston Valves. (18) July 11.
Locomotive Front Ends. (Report of Committee to Master Mechanics' Assoc.) (18) July 11.
Results Observed upon the Philadelphia & Reading Ry. in Connection with Inspection of Steel Rails.* Robert Job. (Paper read before Amer. Soc. for Testing Materials.) (13) July 16; (20) July 16.
The "Crewe" System of Electrically-Operated Points and Signals.* (11) July 17.
McBride's Locomotive Feed Water Heater.* (15) July 17.
The Cutting and Laying of Ties.* Hermann von Schrenk. (15) July 17.
The Electric Railways on Long Island.* (17) July 18.

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The System of the Northern Texas Traction Company.* (17) July 18.

The New La Salle Street Station in Chicago.* (18) July 18.

Foundation Brake Rigging. Henry Kolseth. (Paper read before New England R. R. Club.) (15) July 24.

Electro-Pneumatic Interlocking at Solvay, N. Y.* (40) July 24.

The Hudson River Tunnel.* (14) July 25.

The First Third-Rail Road in Switzerland.* Henri Somach. (17) July 25.

Operation of Electric Cars in Cripple Creek District.* (17) July 25.

The Rebuilding of the Gulf & Ship Island.* (15) July 31.

Atlantic Type (4-4-2) Locomotive for the Baltimore & Ohio.* (15) July 31.

Progress of the Atlantic Avenue Improvement of the Long Island Railroad.* (15) July 31.

Atlantic Avenue Improvement on the Long Island Railroad.* (40) July 31.

The Wellman-Street Fifty-Ton Steel Hopper Car.* (40) July 31; (18) Aug. 1.

Storage Batteries on Electric Railways. Howard S. Knowlton. (9) Aug.

Specifications for Locomotive Axles and Forgings.* (Abstract of Report of Committee, Master Mechanics' Assoc.) (25) Aug.; (18) Aug. 1.

Cast-Iron Wheels.* (Abstract of Report of Committee, Master Car Builders' Assoc.) (25) Aug.

Culm Burning Passenger Locomotives; 4-6-0 Type; Delaware & Hudson Company.* (25) Aug.

The Main Shops of the American Locomotive Company at Schenectady.* (14) Aug. 1.

Denver & Northwestern Interurban Road for Hauling Coal.* (17) Aug. 1.

Electric Interurban between Columbus and Zanesville.* (17) Aug. 1.

Experiments with Steel and Reinforced Concrete Ties.* (18) Aug. 1.

Side Bearings and Center Plates.* (Abstract of Report of Master Car Builders' Committee.) (18) Aug. 1.

Train Lighting with Steam Turbines.* Geheimrath Wichert. (19) Aug. 1.

The Milan-Gallarate Electric Railway.* P. Letheule. (27) Aug. 1.

New Terminal Station at Chicago for the C., R. I. & P. Ry. and the L. S. & M. S. Ry.* (13) Aug. 6.

Stremmatograph Tests of Fiber Strains in Rails under Moving Locomotives. P. H. Dudley, M. Inst. Min. Engrs. (Paper read before the Amer. Soc. for Testing Materials.) (13) Aug. 6; (40) July 24.

Plotting of Speed Time and Speed Distance Curves from the Acceleration Speed Curve.* L. A. Freudenberger. (27) Aug. 8.

Frein-Électro-Magnétique "Westinghouse."* George Lesourd. (32) May.

Éclairage des Voitures de Chemins de Fer au Moyen de l'Incandescence per le Gaz.* H. Giraud and G. Mauclère. (38) May.

Experiénces sur le Rendement des Locomotives.* Joseph Nadal. (38) May.

Traction Electrique dans le Tunnel de la Mersey; Chemin de Fer de Liverpool à Birkenhead.* Ch. Dantin. (33) May 16.

Création d'une Nouvelle Gare Centrale de Triage à Chicago.* (38) June.

Note sur les Postes Électriques (Système Taylor) de la Gare de Pétange (Grand Duché de Luxembourg).* Collot. (38) June.

Nouvelle Locomotive de Banlieue du "Great Eastern Railway."* R. Bounin. (36) June 25.

Chemin de Fer Électrique de Fribourg-Morat-Anet (Suisse).* H. Somach. (33) June 27.

Types Récents de Voitures des Chemins de Fer et Tramways Autrichiens.* A. Morizot. (34) July.

Essais de Pièces de Locomotives en Acier Moulé par la Compagnie du Chemin de Fer du Nord. M. Du Bousquet. (38) July.

Voitures Automotrices à Vapeur (Système V. Purrey) Construites pour la Compagnie Paris-Lyon-Méditerranée.* J. Tête. (38) July.

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Electric Tramways. Charles Hopkinson, M. Inst. C. E., Bertram Hopkinson and Ernest Talbot, M. Inst. C. E. (63) Vol. cli.

A System of Electric Lighting for Cars. James F. McElroy. (42) Apr.

The Transportation Problem of Greater New York. W. W. Wheatly. (65) May.

Progress in British Tramways. (11) May 8.

The London County Council Electric Tramways: The Construction and Equipment of the Westminster-Tooting Section.* (26) May 15; (12) May 15.

Recent Developments in High-Speed Electric Traction in Germany.* (17) May 16.

The Mersey Electric Railway.* (26) May 22.

General Electric Company's Surface Contact System.* (11) May 29.

Mechanical Traction on Tramways.* (19) May 30.

New Automatic Fender and Wheel Guard. (46) May 30.

Foundations for the Elevated Structure of the Boston Elevated Railway.* Geo. A. Kimball. (1) June.

Notes on European Tramways.* Richard McCulloch. (4) June.

An Interesting Example of Wide Arch Soft Ground Tunneling (Boston Subway Extension).* (13) June 4.

London United Tramways Power Station.* (12) June 5.

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The Electrification of the Underground (London).* Wilfred Yorke. (26) June 5.
Section 4, New York Rapid Transit R. R.* (14) Serial beginning June 6.
Recent Additions to the Generating Plant of the Montreal Street Railway.* Ralph D. Mershon. (17) June 6.
Fifty-Second Avenue Terminal in Chicago.* (17) June 6.
Conduit System of the London County Council.* (17) June 6.
London Conduit Railway System.* (27) June 18.
Hampshire Light Railways.* (26) June 19.
The Electrical Conductivity of Copper. Rollo Appleyard, A. M. Inst. C. E. (26) Serial beginning June 19.
M. C. B. Truck for Brooklyn Elevated Railway.* (17) June 20.
The 4 000-Horse Power Engines at the Third Avenue Brooklyn Power House.* (64) July.
Open Elevated Motor Car—Brooklyn Heights Railroad.* (15) July 3.
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Emergency Car and Other Wrinkles on the Orange & Passaic Valley Railway.* (17) July 4.
An Emergency Track Brake used by the United Railroads of San Francisco.* (17) July 4.
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The Paris Metropolitan Railway.* (12) Serial beginning July 10.
Notes on the Des Moines City Railway.* (17) July 11.
Proposed Inner Circle System for Chicago.* (17) July 11.
Private Telephone System of the Manhattan Railway Company.* (17) July 11.
Station Indicators for Subway, Elevated and Other Railway Systems.* Ernest K. Adams. (27) July 11.
Power Station for the Underground Electric Railways Company of London.* (17) July 18.
Elevated Railways.* Gerald Barker. (11) July 24.
Power Brakes in St. Louis. R. P. Garrett. (15) July 24.
Milford Street Railway System.* (17) July 25.
Ventilating Railway Motors.* (17) July 25.
The Reorganization of the Condensing System of the Manhattan Station.* (64) Aug.
The Missouri River Power Station of the Metropolitan Street Railway Company, of Kansas City, Mo.* (17) Aug 1.
Tramway Conditions in America and Great Britain Compared. Chris. J. Spencer. (17) Aug. 1.
Permanent Way Construction and Maintenance. Charles A. King. (17) Aug 1.
Erection of Manhattan Valley Viaduct.* (14) Aug. 8: (20) July 30.
The Power Plant for the Metropolitan Street Railway of Paris.* Émile Guarini. (19) Aug. 8.
Traction Électrique: Prise de Courant par Contact Superficiel: Système Paul.* René Philippe. (34) May.
Le Chemin de Fer Suspendu de Barmen-Elberfeld-Vohwinkel. René Philippe. (35) Serial beginning May.
Étude Générale sur le Chemin de Fer Métropolitain de Paris. (36) Serial beginning May 25.

Sanitary.

Portslade and Southwick Drainage, 1902: Intercepting Sewer and Outfall. George Stow, Assoc. M. Inst. C. E. (63) Vol. cli.
Red River Valley Drainage Ditches; Their Repair and Maintenance.* W. R. Hoag. (1) Apr.
The Action of the Septic Tank on Acid Iron Sewage. (14) May 16.
An Investigation of a Garbage Crematory. (Extract from a report by Rudolph Hering to the Special Committee on Crematory of the City Council of Trenton, N. J.) (19) Serial beginning May 16.
Swampscott Sewerage System.* (14) May 23.
The Chicago Intercepting Sewer System.* (13) May 28.
A Difficult Sewer Crossing Under an Old Aqueduct in Brooklyn.* (14) May 30.
Water Supply in the Mutual Life Insurance Building, New York.* (14) May 30.
The Composition of Sewage in Relation to Problems of Disposal. George W. Fuller. (7) June.
Power and Pumping Stations of the New Orleans Drainage System.* William Mayo Venable. (0) June.
The Baynes Garbage Disposal Works at Buffalo. (14) June 6.
The Garbage Reduction Plant at Baltimore.* (14) June 13.
American Blower Company's New Office Building: Heating and Ventilating System.* (20) June 25; (15) July 17; (40) July 24; (14) July 25; (23) Aug.
High-Pressure Steam Heating Transmission and Electric Lighting Plant at Dresden.* Franz Köster. (14) July 4.
The Northwestern Ave. Sewer at Indianapolis. Ind.* W. Buehler. (13) July 16.
An Improved Steam-Heating System.* (13) July 23.

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On the Distribution of Sewage on Bacteria Beds. John C. Thresh and Martin Priest. (Abstract of paper read before Inst. of San. Engrs.) (12) July 24.

Concrete Sewer at Coldwater, Mich. (14) July 25

Air Heating with Radiators and a Closed Piping System. (13) July 30.

Commission Chargée de l'Étude des Questions Relatives à la Pollution des Cours d'Eau: Mission en Angleterre: Rapport de la Sous-Commission. (Belgium).* (30) June.

Assainissement des Villes. (36) Serial beginning July 10.

La Balayeuse Automatique Anti-Microbienne et l'Incinération des Ordures à New York.* Albert Reyner. (36) July 10.

Structural.

Concrete. Acheson Smith. (58) Apr.

Cement—Its Manufacture, What It Is, and How to Test It. Armin Schotte. (58) Apr.

Water Tightness in Concrete. Thos. P. Roberts. (58) Apr.

A Reinforced Concrete Floor Used in the Youngstown Car Barn. H. M. Scofield. (58) Apr.

Ferro-Concrete Warehouse at Newcastle-on-Tyne.* (67) May.

Portland Cement Manufactured from Blast Furnace Slag. C. de Schwarz. (Paper read before the Iron and Steel Inst.) (22) May 8; (57) May 15; (28) May 28; (12) May 22; (62) June 4.

Structural Details of the Medical Buildings, Cornell University.* (14) May 16.

A New System of Finishing Concrete Structures.* (13) May 21.

Paint as a Preservative of Iron from Rust. (12) May 22.

A Tall Concrete-Steel Office Building.* (14) May 23.

Grillage *vs.* Concrete Foundations. J. C. Hain. (18) May 23.

Sand Cement for Concrete Works Remote from Transportation Lines. (Abstract from Bulletin No. 213, U. S. Geological Survey.) Edward Duryee. (13) May 28.

A New Creosoting Process. Hermann von Schrenk. (15) May 29.

Boston Foundations. Joseph R. Worcester. (1) June.

Foundations. George B. Francis. (1) June.

Specifications for Material and Workmanship for Steel Structures.* T. L. Condron. (4) June.

Timber and Composite Roofs.* (21) Serial beginning June.

Self-Supporting Steel Stacks. R. E. Newton, Assoc. M. Am. Soc. C. E. (14) June 6.

The Bi-Centennial Memorial Buildings of Yale University.* (14) June 6.

The Aiken Improved Roof Construction for Manufacturing Plants.* (20) June 11.

The Testing of Building Stone. Edwin C. Eckel. (16) June 20.

The British Fire Prevention Committee and Its Work. (19) June 20.

The New Shops of the American Locomotive Company at Schenectady.* Lindsay Duncan. (14) June 27.

The Use of Iron Pipe in Structural Work.* Egbert P. Watson. (9) July.

Portland Cement Manufacture: The Raw Materials. Edwin C. Eckel. (60) July.

The Proposed Brooklyn Bridge Terminal and New York Municipal Building.* (13) July 9.

The Works of the St. Louis Portland Cement Company, Prospect Hill, Mo.* John E. Conzelman. (14) July 11.

A Standard Method for the Analysis of Cement. (13) July 16.

The Relative Strength of Wet and Dry Concrete. James W. Sussex. (Reprinted from the *Technograph.*) (13) July 16.

A Table for Pitch and Efficiency of Riveted Joints. Philip B. Hill. (13) July 16.

The Erection of a Tall Concrete Office Building (Ingalls Bldg., Cincinnati).* (14) July 18.

The Steel Manufacturers' Standard Specifications. Albert Ladd Colby. (Abstract of paper read before the Amer. Soc. for Testing Materials.) (14) July 18; (62) Serial beginning Aug. 6.

The Plant of the Hudson Portland Cement Co., at Hudson, N. Y.* (13) July 23.

Soundness Tests of Portland Cement.* W. P. Taylor, Jun. Am. Soc. C. E. (Paper read before Cement Section, Amer. Soc. for Testing Materials.) (13) July 23.

International Fire-Prevention Congress. (11) July 24.

The New York Shipbuilding Company's Plant, Camden, N. J.; Pt. II.* (14) July 25.

American Blower Company's New Office Building.* (14) July 25.

Sixteen-Story Concrete-Steel Office Building at Cincinnati, O.* (13) July 30.

The Strength of Concrete as Affected by Different Percentages of Water. T. L. Doyle and E. R. Justice. (13) July 30.

Tests of Portland Cement Mortar Exposed to Cold. C. S. Gowen, M. Am. Soc. C. E. (Paper read before Amer. Soc. for Testing Materials.) (13) July 30.

Rational Formulas for the Strength of a Concrete-Steel Beam. S. E. Slocum. (13) July 30.

Rivets in Structural Steel Work.* C. J. Tilden, Assoc. M. Am. Soc. C. E. (Reprinted from *Harvard Engineering Journal.*) (13) July 30.

The Main Shops of the American Locomotive Company at Schenectady.* (14) Aug. 1.

Effect of Water and Combinations of Sand on the Setting and Strength of Cement. E. S. Larned. (Abstract of paper read before the Amer. Soc. for Testing Materials.) (13) Aug. 6.

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The Cause of the Cementing Value of Rock Powders and the Plasticity of Clays. Allerton S. Cushman. (Abstract of paper read before the Amer. Soc. for Advancement of Science.) (13) Aug. 6.

Preservation of Wood. (Translated from *La Chronique Industrielle.*) (19) Aug. 8.

Note sur les Cables Témoins: Système F. Arnodin. F. Arnodin. (32) Mar.

Les Sables Boulants: Méthodes Nouvelles de Constructions dans les Terrains Aquifères.* A. Casse. (30) June.

Essai d'une Théorie des Voûtes d'Égale Résistance. Maurice Astier. (35) Serial beginning June.

La Nouvelle Caserne de Sapeurs-Pompiers de la rue Carpeaux.* M. Marchand. (33) June 6.

Le Nouveau Pavillon du Pesage de l'Hippodrome de Longchamp.* Couraud. (36) June 10.

La Méthode Chartiée pour l'Essai au Choc des Aciers Laminés.* Léon Griveaud. (34) July.

Pavillon de Chirugie à l'Asile Clinique Sainte-Anne, rue d'Alésia, à Paris.* Ed. Perronne. (35) July.

Fabrique de Ciment Portland de Rudelsbourg (Saxe).* (35) July.

Les Bains Publics Karl Müller à Munich.* (33) July 18.

Topographical.

The Construction of Maps and Charts.* G. J. Morrison. (20) May 8.

The New Coast and Geodetic Survey Precise Level; a Possible Successor of the Wye Level.* John F. Hayford. (13) July 2.

Base Line Measurement at West Point.* Joseph E. Kuhn. (14) July 25.

A Graphical Method of Setting Slope Stakes. J. M. Rudiger. (13) July 30.

The Magnetic Observatories of the United States Coast and Geodetic Survey in Operation on July 1, 1902.* L. A. Bauer and J. A. Fleming. (19) Aug. 8.

Water Supply.

Wrought-Steel Conduits for Gravitation and Pressure Water-Supply. Herbert Fetherston Lloyd. (63) Vol. cli.

A Comparison of Three Methods of Estimating Quantities of Soil Stripping from Water Supply Reservoirs. (1) Apr.

Method of Estimating Quantities of Soil Excavation from Wachusett Reservoir.* Charles A. Bowman. (1) Apr.

St. Louis Water Supply. R. E. McMath. (1) May.

The Center Square Water-Works of Philadelphia; The Source of Water Supply from 1801 to 1815.* (13) May 14.

The Utilization of Utah Lake as a Reservoir.* W. P. Hardesty. (13) May 21.

A Gas Engine Pumping Station.* (14) May 23.

Construction Work for a Water Power Plant near Danville, Va.* (14) May 30.

Tests with a Pelton Wheel. Wm. Campbell Houston. (Paper read before the Inst. of Engrs. and Shipbuilders in Scotland.) (47) Serial beginning May 30.

Hydraulic Developments as Related to Electric Installations.* Wm. B. Jackson. (4) June.

Report of Tests of Three New Pumps for Chicago Water Works, Made in 1902.* (4) June.

Great Electric Installations of Italy: The Hydro-Electric Station of Cenischa.* Enrico Bignami. (9) June.

Pipe and Pipe Laying for the Metropolitan Water-Works.* Caleb Mills Saville. (28) June.

The Echo Lake Dam. at Milford, Mass.* Leonard Metcalf. (28) June.

The Water Supply of New Orleans and Its Improvement.* Robert Spurr Weston. (28) June.

A Little Talk about Water Rates. John C. Chase. (28) June.

Underground Water: Suggestions on How to Obtain and Care for It. George Bowers. (28) June.

How I Reduce Pressure on a Gravity System.* E. H. Gowing. (28) June.

Automatic Drop Shutters for the Betna Irrigation Dam, India.* Herbert M. Wilson, M. Am. Soc. C. E. (13) June 4.

The Heisler Compensating Gear for Direct Acting Pumping Engines.* (13) June 4.

Water Purification Experiments at New Orleans. (14) June 6.

Instructions to Inspectors of Cast-Iron Water Pipe, Special Castings and Stop Valves, Philadelphia. (13) June 11; (14) May 23.

A Small Municipal Water and Electric Light Plant at Tullahoma, Tenn. (13) June 11.

The Spier Falls Dam of the Hudson River Water-Power Company.* (13) June 18.

The Bruun-Lowener Water Softener.* (47) June 13.

The Goss Series Distilling Apparatus* Charles Ducas. (15) June 19.

The Detroit Water-Works: A Short History.* Clarence W. Hubbell, Assoc. M. Am. Soc. C. E. (14) June 20.

Management of Pumping Stations. Kenneth Torrance, M. Am. Soc. M. E. (14) June 20.

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* Illustrated.

Water Supply—(Continued).

A Very Tall Steel Water Tower.* (14) June 20.
Past and Present Pumping Methods in the Metropolitan Water District of Massachusetts. A. O. Doane. (14) June 20.
Progress of the Construction of the New Croton Dam.* (14) June 20.
On the Design and Construction of Slow-Sand Filters. John H. Gregory, M. Am. Soc. C. E. (14) June 20.
Hydraulic Diagrams and Further Notes upon the Hazen-Williams Slide Rule.* Leonard Metcalf. M. Am. Soc. C E. (14) June 20.
Raising Two Lines of 36-Inch Pipes at the Mystic River, Somerville, Mass. John L. Howard. (14) June 20.
The Spier Falls Dam and Power Plant of the Hudson River Water Power Company.* George E. Howe. (14) June 27.
Electric Power from the Hudson.* Alton D. Adams. (27) June 27.
Four Systems of Softening Water for Industrial Purposes.* (13) July 2.
Notes on Progress of Cincinnati's New Water Works.* C. N. Miller. (14) July 4.
The Great Goose Creek Dam for the Denver Water Supply.* (46) July 4.
The Harris-Anderson Water Softener. (11) July 10.
Some Recent Effects of Electrolytic Action upon Underground Mains and Other Metals.* A. A. Knudson. (Paper read before the Amer. Water-Works Assoc.) (24) July 13.
The Water Supply of Manila, P. I. (From the New York *Medical Record.*) (13) July 16.
Shall Water Departments Charge for Private Fire Lines, and Shall Meters Be Placed Thereon? F. A. W. Davis. (Paper read before Amer. Water-Works Assoc.) (13) July 16.
A High Masonry Dam in Germany.* (13) July 16.
An Interesting Test of an Unfinished Arch Dam (Ithaca Water-Works).* (14) July 18.
Surveys for Electrolysis and Their Results. D. H. Maury, M. Am. Soc. C. E. (Paper read before Amer. Water-Works Assoc.) (13) July 23.
The Failure of the Oakford Park and Fort Pitt Dams near Jeannette, Pa.* Willis Whited, Assoc. M. Am. Soc. C. E. (13) July 23.
Water Raising from Deep Wells by Compressed Air. William H. Maxwell, A. M. Inst. C. E. (Paper read before the British Assoc. of Water-Works Engrs.) (47) July 25.
Water for the Gold Fields of Western Australia.* D. M. Bates. (10) Aug.
Remodeling a Chicago Pumping Station.* (14) Aug. 1.
Venturi Meters on Municipal Supplies in the Massachusetts Metropolitan District.* (14) Aug. 1.
Report of the Commission of the Jerome Park Reservoir. (13) Aug. 6.
The New Water-Works for Jersey City.* (14) Aug. 8.
Ferrous Sulphate as a Coagulant in the Mechanical Filtration of Water. Ernest E. Irons. (14) Aug. 8.
Hydraulic-Electric Development of the Neversink Light and Power Company, Middletown, N. Y.* (27) Aug. 8.
Stérilisation de l'Eau par l'Ozone.* Ed. Imbeaux. (36) Serial beginning June 25.
Stérilisation et Filtration des Eaux d'Alimentation par les Procédés H. Desrumaux.* F. Gramyr. (36) July 25.

Waterways.

Some Bucket-Ladder Dredges. Sidney Herbert Hunter, M. Inst. C. E. (63) Vol. cli.
A Small "Home-Made" Dipper Dredge or Steam Shovel.* (13) May 14.
The 15-Cu. Yd Dipper Dredge for the New York Harbor Improvements.* (13) May 14.
The Corinthian Canal.* (15) May 22; (19) July 25.
The Proposed Terminal at St. George, Staten Island.* (17) May 30.
The Failure of a Sea Wall and Its Reconstruction.* Clarence T. Fernald. (1) June.
The Panama Canal: The Dual *Versus* the Single-Lake Project. By Henry L. Abbot. With Reply by George S. Morison. (9) June.
Notes on Weirs in India.* (12) Serial beginning June 5.
The Dover Harbour Works.* (11) June 12.
A New Method of Automatic Sounding for Measuring Dredging. (13) June 18.
The New Harbor Works at Dover.* Harold J. Shepstone. (19) June 27.
Electric Haulage on Canals. Frank C. Perkins. (46) June 27.
Modern European Excavating Machinery and Dredges.* (41) July.
The Galveston Sea Wall.* (14) July 4.
An Improved Centrifugal Dredging Pump.* Mason M. Patrick. (13) July 9.
The Recent Mississippi River Floods and Their Relation to the Levees. T. G. Dabney. (13) July 9.
Belfast Harbour and Its Development.* G. F. L. Giles, M. Inst. C. E. (Paper read before the Inst. of Naval Archts.) (11) July 17.
Notes on the Ports and Harbours of Peninsular India. Horace Bell, M. Inst. C. E. (29) July 17.
Experience in Diamond Drill Works on the Deep Waterways Survey, with Statistics of Cost. (13) July 23.
A Large Ore Dock at Escanaba, Mich.; Chicago & Northwestern Railway.* (13) July 30.
The Proposed Forth-Clyde Ship Canal, Scotland. (13) Aug. 6.
Les Feux Flottants: Le Sandettié.* M. Ribière. (43) 4^{e} Trimestre, 1902.

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* Illustrated.

Waterways—(Continued).

Les Voies Navigables de l'Allemagne et plus particulièrement de la Prusse de 1875 à 1900. M. Duval. (43) 4e Trimestre, 1902.
L'Éclairage du Phare de Chassiron à l'Incandescence par l'Acétylène.* M. de Joly. (43) 4e Trimestre, 1902.
Étude de l'Administration Actuelle du Port de Londres et du Projet de Transformation Presenté au Parlement par la Commission Royale Nommée à Cet Effet. M. Aron. (43) 4e Trimestre, 1902.
Les Phares du Sud de la Mer Rouge et Leur Installation.* J. Benard. (32) Apr.
Écluse Oscillante, Système Cardot.* A. Morel. (36) Serial beginning May 10.
Drague Marine Portense à Godets et à Succion du Port de Montevideo.* Ch. Dantin. (33) May 28.

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* Illustrated.

Vol. XXIX. SEPTEMBER, 1903. No. 7.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

September 2d, 1903.—The meeting was called to order at 8.45 P. M., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 70 members and 12 guests.

The minutes of the meeting of June 3d, and of the Business Meeting of the Annual Convention at Asheville, N. C., on June 9th and 10th, 1903, were approved as printed in *Proceedings* for August, 1903.

The Secretary brought to the attention of the meeting a resolution, by J. W. Schaub, M. Am. Soc. C. E., which had been passed at the meeting of June 11th of the Annual Convention, as follows:

> "It is the sense of this meeting that a Special Committee be appointed to take up the question of concrete and steel-concrete, and that such committee co-operate with the Association for Testing Materials, and the Railway Engineers' Maintenance of Way Association, which also have a committee on this subject."

The Secretary then moved, on behalf of Mr. Schaub, that a Special Committee on Concrete-Steel be appointed, and the matter referred to the Board of Direction. (Art. VI, Sec. 12 of the Constitution.)

The motion, being duly seconded, was adopted by a vote of more than twenty-five Corporate Members.

A paper, entitled "An Experimental Study of the Resistances to the Flow of Water in Pipes," by Augustus V. Saph, Assoc. Am. Soc. C. E., and Ernest W. Schoder, Jun. Am. Soc. C. E., was presented by the Secretary, who also read communications on the subject from Messrs. A. Flamant, Hiram F. Mills, E. C. Thrupp and Allen Hazen.

Ballots for membership were canvassed, and the following candidates elected:

AS MEMBERS.

GEORGE SAMUEL HAYES, New York City.
RICHARD CARMICHAEL HOLLYDAY, Brooklyn, N. Y.
LEONARD METCALF, Boston, Mass.
OLAF EINAR MOGENSEN, St. Louis, Mo.
WILLIAM BABCOCK POLAND, Cincinnati, Ohio.
HORACE ROPES, South Framingham, Mass.

AS ASSOCIATE MEMBERS.

JOHN YANCEY BAYLISS, Bardstown, Ark.
JAMES GEORGE BEACH, Philadelphia, Pa.
CHARLES EDWARD FRASER, New York City.
JULIAN HASTINGS GRANBERY, Elizabeth, N. J.
ARTHUR NEWHALL JOHNSON, Baltimore, Md.
JAMES AUGUSTUS KELLEY, Hedgesville, W. Va.
CLIFFORD LEWIS, Jr., Utica, N. Y.
ELBERT CLYDE MACY, St. Paul, Minn.
NICHOLAS DAUBENEY MONSARRAT, Columbus, Ohio.
JOSEPH EDGAR MURPHY, Galesburg, Ill.
CHARLES FREDERIC PARKER, Mapimi, Durango, Mexico.
CHARLES MARCELLUS PRITCHETT, Washington, D. C.
WILLIAM EVERETT SWIFT, Washington, D. C.

The Secretary announced the election of the following candidates:

By the Board of Direction on September 1st, 1903;

AS ASSOCIATE.

MAXIMILIAN TOCH, New York City.

As Juniors.

John Henry Burgoyne, Jr., Buffalo, N. Y.
Silas Stewart Feeter, Little Falls, N. Y.
Carl Hugo Jabelonsky, New York City.
Clarence William Meyers, Ithaca, N. Y.
John Endicott Porter, Danvers, Mass.
Alfred Francis Sauer, Elizabeth, N. J.
James Lloyd Tatlock, New Rochelle, N. Y.

On Reconsideration Ballot canvassed by the Board of Direction September 1st, 1903:

As Member.

Frank Churchill Horn, Cheesman, Colo.

The Secretary announced the following deaths:

Alphonse Fteley, Past-President, Am. Soc. C. E., elected Member January 5th, 1876; President, January 19th, 1898, to January 18th, 1899; died June 11th, 1903.

George Shattuck Morison, Past-President, Am. Soc. C. E.; elected Member January 5th, 1875; President, January 16th, 1895, to January 15th, 1896; died July 1st, 1903.

Charles Cyril Martin, elected Member July 10th, 1872; Vice-President, 1894–1895; died July 11th, 1903.

Charles Frederick Dunham, elected Member April 2d, 1902; died June 13th, 1903.

Frederick Winn Bond, elected Member December 7th, 1898; died July 12th, 1903.

Eugene Vanderpool, elected Member September 2d, 1874; died July 12th, 1903.

Cornelius Palmer, elected Member November 2d, 1887; died July 31st, 1903.

Sylvanus Thayer Abert, elected Member September 21st, 1870; died August 11th, 1903.

John Elfreth Watkins, elected Associate January 2d, 1889; died August 11th, 1903.

The Secretary announced that the Board of Direction had decided that the Annual Convention of 1904 would be held at St. Louis, Mo., during the week beginning October 3d, at which time there will also meet an International Congress of Engineering, of which this Society has been asked to take charge.

Adjourned.

September 16th, 1903.—The meeting was called to order at 8.45 P. M., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 65 members and 14 guests.

A paper entitled "Theory of Centrifugal Pumps and Fans; Analysis of Their Action, with Suggestions for Designs," by Elmo G. Harris, M. Am. Soc. C. E., was presented by the Secretary, who also read communications on the subject by Messrs. William Mayo Venable and E. T. Adams. The paper was discussed further by Messrs. Allen Hazen and W. M. White.

A second paper, entitled "Tests of the Efficiency of Hoisting Tackle," by S. P. Mitchell, M. Am. Soc. C. E., was also presented by the Secretary.

The Secretary announced the following deaths:

John Austin Patterson, elected Member May 2d, 1900; died May 3d, 1903.

Reuel Willard Ware, elected Member April 1st, 1874; died September 11th, 1903.

Robert Delano Cushing, elected Associate Member September 6th, 1899; died September 8th, 1903.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

September 1st, 1903.—8.35 P. M.—President Noble in the Chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Craven, Davison, Knap, Moore, Osborn, Osgood, Pegram, Schneider and Wilgus.

It was decided to hold the Thirty-sixth Annual Convention of the Society at St. Louis, Mo., during the week beginning October 3d, 1904.

Under a resolution of the last Annual Meeting, to the effect that the Society should co-operate with the Louisiana Purchase Exposition Company in the inauguration of an International Congress of Engineering, and the Society having been invited by the Exposition authorities to take charge of such International Congress, the following Committee to represent the Society in the matter was appointed:

Chairman, Henry S. Haines;
William Metcalf,
William P. Craighill,
E. L. Corthell,
Robert W. Hunt,
A. A. Robinson,
M. L. Holman,
Treasurer, Joseph M. Knap;

Vice-Chairman, L. F. G. Bouscaren;
Benjamin M. Harrod,
M. T. Endicott,
Joseph Ramsey, Jr.,
L. B. Stillwell,
George B. Post,
Palmer C. Ricketts,
Secretary, Chas. Warren Hunt.

Reconsideration Ballots were canvassed and Frank Churchill Horn was declared elected a Member of the Society.

A report was received from the Committee representing the Board in the matter of the proposed Joint Engineering Building, and the following resolution was unanimously adopted:

Whereas, at the Annual Convention held at Asheville, June 10th, 1903, resolutions were passed authorizing the Board of Direction to hold conferences bearing on the advisability of the acceptance of Mr. Carnegie's proposition to this Society for a proposed Union Engineering Building, and

Whereas, at a meeting of the Joint Committee on said Building the Committee representing this Board expressed the opinion that unless an entire division of the building, fund, and management, is made between the Engineers' Club, and the four technical societies proposing to use said building, this Board cannot see its way clear to recommend to the American Society of Civil Engineers the proposition to join with the others in the project.

Resolved, that the said action of the Committee of this Board is hereby endorsed as having the approval of the Board of Direction of the Society.

The following Committee to recommend the award of prizes for the year ending with the *Transactions* of June, 1903, was appointed: Charles E. Greene, E. P. Dawley, Wynkoop Kiersted.

The report of the Nominating Committee was received.

Applications were considered and other routine business transacted.

One candidate for admission as Associate, and seven as Junior were elected.*

Adjourned.

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* See pages 342 and 343.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, October 7th, 1903.—8.30 P. M.—A regular business meeting will be held. Ballots for membership and ballots on the proposed amendment to the Constitution will be canvassed, and a paper by Francis Robert Johnson, M. Am. Soc. C. E.; entitled "South African Irrigation," will be presented for discussion.

This paper was printed in *Proceedings* for August, 1903.

Wednesday, October 21st, 1903.—8.30 P. M.—At this meeting two papers will be presented, as follows: "Some Railway Construction in Oklahoma," by A. G. Allen, Assoc. M. Am. Soc. C. E.; and "The Fatigue of Cement Products," by J. L. Van Ornum, M. Am. Soc. C. E.

These papers were printed in *Proceedings* for August, 1903.

Wednesday, November 4th, 1903.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper by Eugene Goetze, Esq., entitled "Filtration for Public Water Supplies, with Especial Reference to the Double Filtration Plant at Bremen, Germany," will be presented for discussion.

This paper is printed in this number of *Proceedings*.

Wednesday, November 18th, 1903.—8.30 P. M.—At this meeting a paper by George Cecil Kenyon, Assoc. M. Am. Soc. C. E., entitled "Dock Improvements at Liverpool," will be presented for discussion.

This paper is printed in this number of *Proceedings*.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction to the members who have made use of the resources of the Society in this manner has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling compared to the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

UNIVERSAL EXPOSITION, ST. LOUIS, 1904.

The Society has undertaken to provide for an Engineering Exhibit, and the establishment of Headquarters for visiting engineers, and the Board of Direction has appropriated sufficient funds to defray the necessary expense.

This matter is in the hands of the following Committee:

ROBERT MOORE, M. Am. Soc. C. E., St. Louis, Mo., *Chairman.*
EDWARD C. CARTER, M. Am. Soc. C. E., Chicago, Ill.
MORDECAI T. ENDICOTT, M. Am. Soc. C. E., Washington, D. C.
JAMES L. FRAZIER, " " Frankfort, Ind.
WILLIAM JACKSON, " " Boston, Mass.
EMIL KUICHLING, " " New York, N. Y.
JOHN F. WALLACE, " " Chicago, Ill.
H. J. PFEIFER, Assoc. M. Am. Soc. C. E., St. Louis, Mo., *Secretary.*

INTERNATIONAL ENGINEERING CONGRESS.

The Society has also agreed to take charge of an International Engineering Congress to be held at St. Louis during the week beginning October 3d, 1904, and has appointed the following Committee, under whose supervision this work will be carried on:

Henry S. Haines,	M. Am. Soc. C. E.,	New York, N. Y., *Chairman.*
L. F. G. Bouscaren,	" "	Cincinnati, O., *Vice-Chairman.*
William Metcalf,	" "	Pittsburg, Pa.
Benjamin M. Harrod,	" "	New Orleans, La.
William P. Craighill,	" "	Charlestown, W. Va.
M. T. Endicott,	" "	Washington, D. C.
E. L. Corthell,	" "	New York, N. Y.
Joseph Ramsey, Jr,,	" "	St. Louis, Mo.
Robert W. Hunt,	" "	Chicago, Ill.
L. B. Stillwell,	" "	New York, N. Y.
A. A. Robinson,	" "	St. Louis, Mo.
George B. Post,	" "	New York, N. Y.
M. L. Holman,	" "	St. Louis, Mo.
Palmer C. Ricketts,	" "	Troy, N. Y.
Joseph M. Knap,	" "	New York, N. Y., *Treasurer.*
Chas. Warren Hunt,	" "	New York, N. Y., *Secretary.*

ANNUAL CONVENTION, 1904.

It has also been decided to hold the Thirty-sixth Annual Convention at St. Louis during the same week (beginning October 3d, 1904).

It is expected and hoped that the visit of members of the Institution of Civil Engineers to this country, by invitation of this Society, will be so timed that their participation in the International Engineering Congress will be assured.

As the details of the above matters are developed, they will be announced in *Proceedings.*

ACCESSIONS TO THE LIBRARY.

From August 9th to September 8th, 1903.

DONATIONS.*

TELEPHONY.

A Manual of the Design, Construction, and Operation of Telephone Exchanges. By Arthur Vaughan Abbott. Parts I-III. Cloth, 8 x 6 ins., illus. New York, McGraw Publishing Company, 1903. $1.50 per volume; set of six, $6.00.

It has been the endeavor of the author to collect in this series the consensus of what appears to be the best prevailing practice, in the hope that it may at least serve as a guide-post along the telephonic road. Part I. commences with rules for the selection of the office site. Part II. deals with the history of conduit construction. It endeavors to portray and describe the conduit forms of the present, such as experience has sanctioned. In Part III. the author has collected such data as he believes may be of service to the telephone engineer in the design and installation of the underground portion of the wire circuits, and has pointed out the principal direction which the probable trend in the design and manufacture of the cables of the future will take.

CHIMNEY DESIGN AND THEORY.

A Book for Engineers and Architects. By William Wallace Christie, M. Am. Soc. M. E. Second Edition, Revised and Enlarged. Cloth, 9 x 6 ins., 8 + 192 pp., illus. New York, D. Van Nostrand Company, 1902. $3.00.

To this edition some twenty-five pages of text and twelve full-page illustrations have been added. Radial brick chimneys, which were just being introduced in the United States as the first edition went to press, are now treated briefly. The author has endeavored to round out the work, thus meeting some of the criticisms made by the reviewers of the original publication. The Contents are: Introduction and History; Theory of Chimney Draft; Chimney Formulæ; Chimney Tables, Wind Pressure, Air-Space in Grates; Foundation Materials, Brick Chimney Materials; Steel Chimneys—Theory Pertaining to Same, and Examples from Existing Structures; Brick Chimneys—Theory Pertaining to Same, and Examples from Existing Structures; Chimney Performances—Special Types—Straightening Chimneys—Flues; House Chimneys; Lightning Protection; General Information. There is an index of eleven pages.

STONES FOR BUILDING AND DECORATION.

By George P. Merrill. Third Edition, Revised and Enlarged. Cloth, 9 x 6 ins., 11 + 551 pp., illus. New York, John Wiley & Sons, 1903. $5.00.

The preface states that this work is based upon the author's handbook and catalogue of the collection of building and ornamental stones in the United States National Museum at Washington. The book has been written from an American standpoint, and treats principally of stones found within the limits of the United States, or imported from other sources. In but few instances are stones mentioned that are of purely historical interest. The changes introduced in the present edition consist of much additional material, correction of errors where found, and an entire revision of the chapter on methods of testing. A brief chapter on the use of drift bowlders for building purposes has also been introduced. Some new illustrations, including five maps showing the geographic distribution of the more important stones, have been added. The Contents are: Historical; The Geographical Distribution of Building-Stones in the United States; The Minerals of Building-Stones; Physical and Chemical Properties of Building-Stones; Rock Classification; Geological Record; Igneous Rocks; Aqueous Rocks; Methods of Quarrying and Dressing Stone; Machines and Implements used in Stone-Working; The Weathering of Building-Stone; On the Selection and Testing of Building-Stone; Methods of Protection and Preservation; Appendices. There is an index of eleven pages.

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* Unless otherwise specified, books in this list have been donated by the Publishers.

THE ELASTICITY AND RESISTANCE OF THE MATERIALS OF ENGINEERING.

By Wm. H. Burr, M. Am. Soc. C. E.; M. Inst. C. E. Sixth Edition, Rewritten and Enlarged. Cloth, 9 x 6 ins., 15 + 990 + 80 pp., illus. New York, John Wiley & Sons, 1903. $7.50.

The preface states that the present edition of this work constitutes almost a new book, one-half or more of the entire volume being new matter. Much of the latter contains original matter not hitherto published. Portions of those chapters on combined bending and direct stress and on the theory and design of concrete-steel members are of this nature. The effort has been to set forth the treatment of concrete-steel beams and other members with fulness, in order to meet the requirements of that rapidly extending field of engineering construction. The author has been permitted to include in this volume a set of tables and cuts of rolled shapes taken from the Handbook of the Cambria Steel Company. The chapters are: Elementary Theory of Elasticity in Amorphous Solid Bodies; Hollow Cylinders and Spheres and Torsion; Flexure; Resilience; Combined Stress Condition; Tension; Compression; Shearing and Torsion; Bending or Flexure; Concrete-Steel Members; Rolled and Cast Flanged Beams; Connections; Plate Girders; Ropes and Chain Cables; Miscellaneous Problems; Working Stresses and Safety Factors; The Fatigue of Metals; The Flow of Solids; General Equations; Thick Hollow Cylinders and Spheres, and Torsion; Energy of Elasticity; Theory of Flexure; Another Method for Finding Pitch of Rivets. There is an index of twelve pages.

MODERN MACHINE SHOP TOOLS.

Their Construction, Operation and Manipulation, Including Both Hand and Machine Tools. By William H. Van Dervoort. Cloth, 9 x 6 ins., 552 pp., illus. New York, Norman W. Henley & Company, 1903. $4.00.

This book is an outgrowth of a series of articles prepared by the author for the students in machine-shop practice at the University of Illinois; some of these articles having been published recently in "Machinery." An effort has been made to treat the subject in a comprehensive manner, avoiding all unnecessary matter and presenting to the apprentice and mechanic many points pertaining to the tools with which they come in daily contact, and about which they are often unable to obtain all the information necessary, in order that they may use these tools correctly and efficiently. The chapter headings are: The Hammer and Cold Chisel; The File and Filing; Scrapers and Scraped Surfaces; Standards of Measure; Calipers; Gauges and Indicators; Rules, Squares and Other Small Tools; Drills; Reamers; Taps and Dies; Drill and Tap Holders; Mandrels; The Lathe; The Lathe in Modified Forms; Lathe Tools; Chucks and Drivers for Lathe Work; Lathe Work, between Centers; Lathe Work on Face Plate, Chuck and Carriage; Boring and Turning Mills; Planing and Shaping Machines, Their Tools and Attachments; Planer and Shaper Work; The Slotting Machine and Key Seater; Milling Machines; Milling Machine Cutters; Milling Machine Work; Gear Cutters and Gear Cutting; Drilling Machines and Drilling Work; Grinding Machines and Grinding; Hardening and Tempering: Fastenings; Gearings; Belting and Transmission Machinery; Miscellaneous Shop Equipment and Conveniences; Useful Tables and Data. There is an index of eight pages.

ELECTRICAL ENGINEERING.

An Elementary Text-Book Suitable for Persons Employed in the Mechanical and Electrical Engineering Trades, for Elementary Students of Electrical Engineering, and for All Who Wish to Acquire a Knowledge of the Chief Principles and Practice of the Subject. By E. Rosenberg. Translated by W. W. Haldane Gee, A. M. I. E. E, and Carl Kinzbrunner. Cloth, 9 x 6 ins., 13 + 267 pp., illus. New York, John Wiley & Sons, 1903. $1 50.

This book had its origin in a number of lectures which the author delivered to the workmen and the staff of a large electrical manufacturing firm. The circle of readers for which this book is intended is, in the first place, the same as that to which the audience belonged. It is intended to give workmen of electrical engineering works the knowledge of the operation of machines and apparatus with which they are concerned. The author has endeavored to use language which people who have only a general school education should be able to understand. In the translation, some change from the original has been inevitable in giving an English dress to the work. The illustrations have been revised, and a number from English firms have been added. The chapter headings are: Fundamental Principles; Magnets—Magnetic Lines of Force; The Continuous-Current Dynamo; The Electric Motor; Accumulators; Working of Dynamos in Parallel; Electric Lighting; Alternating Currents; Alternators; Alternating-Curren Motors; Multiphase Alternating-Current; High Tension. There is an index of three pages.

CATALOGUE OF THE NATIONAL FIRE PROOFING COMPANY OF PITTSBURGH.

Abridged Edition. Author and Compiler, Henry L. Hinton. Morocco, 7 x 5 ins., unpaged, illus. New York, National Fire Roofing Company, 1903. $3.00.

This edition of the catalogue, as is stated in the preface, consists chiefly of a selection of completed pages as electrotyped for an unabridged edition of a forthcoming work in eight different divisions, four of which only are represented here, and these only in part. The following is a synopsis of the abridged edition: Side-Construction Flat Arches; End-Construction Flat Arches; Combination-Construction Flat Arches; "Lintels;" Segmental Arches; Serrated Arches; Girder-Covering Construction; Typical Methods of Construction; Condensed Safe Load Tables; Moment of Resistance Tables—for Beams; Sound-Proof Tests.

AMERICAN STREET RAILWAY INVESTMENTS.

Published annually by the *Street Railway Journal.* For the Use of Bankers. Brokers, Capitalists, Investors and Street Railway Companies. Tenth Annual Volume. 1903. McGraw Publishing Company, New York. $5.00.

The reports of the various railways of which about 1,860 are included in this work, are this year arranged alphabetically by States. There is a comparative table of the gross receipts in 1901 and 1902. The reports for each company give a brief general description of the road, its equipment, operation, traffic and financial statistics, list of officers, etc.

Gifts have also been received from the following:

Aachen Technische Hochschule. 1 pam.
Allentown, Pa.—Water Dept. 1 pam.
Am. Inst. of Arch. 1 vol.
Am. Inst. of Elec. Engrs. 1 pam.
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New England Cotton Mfrs. Assoc. 1 bound vol.
N. Y. City—Dept. of Water Supply, Gas & Electricity. 2 pam.
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Philadelphia, Pa.—Bureau of Surv. 1 bound vol.
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U. S. Weather Bureau. 1 bound vol.
Wellcome Physiological Research Laboratories. 1 bound vol.
Western Soc. of Engrs. 1 pam.
Wis.—State Geol. Surv. 4 bound vol., 1 vol., 2 pam.
Wyo.—State Engr. 2 vol.

BY PURCHASE.

Gas and Petroleum Engines. A Manual for Students and Engineers. By William Robinson, M. Inst. C. E., M. Inst. M. E., M. Inst. E. E. Second Edition, Completely Rewritten. London, E. & F. N. Spon, Ltd.; New York, Spon & Chamberlain, 1902.

The Metallurgy of Zinc and Cadmium. By Walter Renton Ingalls. *Engineering and Mining Journal,* New York, London, 1903.

Modern Electrolytic Copper Refining. By Titus Ulke. New York, John Wiley and Sons; London, Chapman & Hall, Limited, 1903.

The Hydro-Metallurgy of Copper, Being An Account of Processes Adopted in the Hydro-Metallurgical Treatment of Cupriferous Ores, Including the Manufacture of Copper Vitriol . . . with Chapters on the Sources of Supply of Copper and Roasting of Copper Ores. By M. Eissler. London, Crosby Lockwood and Son, 1902.

Ore-Deposits. A Discussion Re-Published from the *Engineering and Mining Journal.* New York, May, 1903. New York and London, *The Engineering and Mining Journal,* 1903.

The Louisiana Purchase and Our Title West of the Rocky Mountains, with a Review of Annexation by the United States. By Binger Hermann. Washington, Government Printing Office, 1900.

The Michigan Engineer, Containing the Proceedings of the Michigan Engineering Society, 1902–03. 2 vol. Published by the Society, Climax, Mich., 1902–03.

The American Woods, Exhibited by Actual Specimens and with Copious Explanatory Text. By Romeyn B. Hough. Parts I–IX. Lowville, N. Y., Published and Sections Prepared by the Author, 1892–1903.

Repertorium der technischen Journal-Literatur. Herausgegeben im kaiserlichen Patentamt. 1902. Berlin, Carl Heymann, 1903.

Railway Legislation in the United States. By Balthasar Henry Meyer. New York, The Macmillan Company; London, Macmillan & Co., Ltd., 1903.

American Street Railway Investments A Supplement to the *Street Railway Journal.* Published Annually for the Use of Bankers, Brokers, Capitalists, Investors, and Street Railway Companies; 1894–1902. 9 vol. New York, Street Railway Publishing Company, 1894–1902.

Colonial and Camp Sanitation. By George Vivian Poore. Longmans, Green and Co., London, New York and Bombay, 1903.

Building Superintendence. A Manual for Young Architects, Students and Others Interested in Building Operations as Carried on at the Present Day. By T. M. Clark. New Edition, Revised and

Rewritten. New York, The Macmillan Company; London, Macmillan & Co., Ltd., 1903.

A Treatise on Hydraulics. By Henry T. Bovey. Second Edition, Rewritten. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1902.

SUMMARY OF ACCESSIONS.

August 9th to September 8th, 1903.

Donations (including 13 duplicates)	255
By Purchase	23
Total	278

MEMBERSHIP.

ADDITIONS.

MEMBERS.

		Date of Membership.
Hayes, George Samuel. 111 Fifth Ave., New York City	Jun. Assoc. M. M.	Dec. 6, 1892 June 3, 1896 Sept. 2, 1903
Metcalf, Leonard. Cons. Engr., 14 Beacon St., Boston, Mass	Assoc. M. M.	Jan. 5, 1898 Sept. 2, 1903
Mogensen, Olaf Einar. Chf. Engr.'s Office, Mo. Pac. Ry. Co., St. L., I. M. & S. Ry. Co., and Leased, Operated and Independent Lines, 502 Missouri Pacific Bldg., St. Louis, Mo.	Assoc. M. M.	April 7, 1897 Sept. 2, 1903
Ropes, Horace. Engr., Weston Aqueduct Dept., Met. Water and Sewerage Board, Mass., South Framingham, Mass		Sept. 2, 1903
Serjeant, Hugh. Care, Western Australian Ry. Dept., Office of Chf. Engr., Perth, Western Australia		Dec. 4, 1901
Tuckey, Thomas William Townsend. Dist. Engr., Imperial Rys. of North China, Tangku, North China		June 3, 1903

ASSOCIATE MEMBERS.

Kelley, James Augustus. Engr. for T. H. Clement & Co., Contrs., 32 South Broad St., Philadelphia, Pa.	Assoc. Assoc M.	Mar. 5, 1901 Sept. 2, 1903
Lewis, Clifford, Jr. Second National Bank Bldg., Utica, N. Y.		Sept. 2, 1903
Maximoff, Sergius Pavlovitch. Engr. to the Imperial Russian Govt.; Asst. at the Imperial Inst. of Public Ways at St. Petersburg, Zabalkanski pr. 67, St. Petersburg, Russia		April 1, 1903
Murphy, Joseph Edgar. Div. Engr., Galesburg and St. Louis Divs., C., B. & Q. R. R., Room 7½ C., B. & Q. Depot, Galesburg, Ill		Sept. 2, 1903
Tidd, Arthur Warren. Care, Comm. on Additional Water Supply, Room 2105, Park Row Bldg., New York City.		June 3, 1903
von Unwerth, Hans. Asst. Engr., Waddell & Hedrick, 608 New Nelson Bldg., Kansas City, Mo		May 6, 1903

ASSOCIATES.

Toch, Maximilian. Toch Bros., 468 West Broadway, New City		Sept. 1, 1903

JUNIORS.

Pillet, Frederick Fischer. Asst. Engr., Board of Public Works, City Hall, Mobile, Ala		June 2, 1903
Sauer, Alfred Francis. 1158 East Jersey St., Elizabeth, N. J.		Sept. 1, 1903
Small, James Hampden, Jr. 129 West 83d St., New York City		Mar. 31, 1903

CHANGES OF ADDRESS.

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Hermann, Edward Adolph....... Room 812, Security Bldg., St. Louis, Mo.

Judson, William Voorhees........Capt., Corps of Engrs., U. S. A., Office of the Chf. of Engrs., U. S. A., Washington, D. C.

Nicolls, William Jasper..........1018 South 49th St., Philadelphia, Pa.

Noble, Theron Augustus..........Engr. in Reclamation Service, U. S. Geological Survey, 427 Peyton Bldg., Spokane, Wash.

Paine, Arthur Bickley.......... .Room 220, Bourse Bldg., Philadelphia, Pa.

Parker, Charles Jeremiah........Asst. to Chf. Engr., N. Y. C. R. R., Room 514, Grand Central Depot, New York City.

Parker, Maurice Stiles...........Care, Winston Bros. & Craney, Hoopeston, Ill.

Renshaw, Alfred Howard.........500 Fifth Ave., New York City.

Rust, Henry Bedinger............Supt., The Rust Boiler Co., 605 German National Bank Bldg., Pittsburg, Pa.

Smith, Joseph Shuter.......... ..Care, Robt. S. Perry, 5104 Pulaski Ave., Germantown, Philadelphia, Pa.

Taylor, Harry...................Capt., Corps of Engrs., U. S. A., Company L, Battalion of Engrs., Manila, Philippine Islands.

Vorce, Clarence Browning........Chf. Civ. Engr., The John F. Kelly Eng. Co., 149 Broadway, New York City.

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Ferguson, John Neil ....Asst. Engr. with the Charles River Basin Comm., 367 Boylston St., Boston, Mass.

Fitzgerald, Christopher Columbus. Roadmaster, Chattanooga Div., C., N. O. & T. P. Ry. Co., Somerset, Ky.

Fox, Walter Gordon..............Bulls Bridge, Conn.

French, Frank Chauncey....... . Acting Asst. Prof. of Civ. Eng., Iowa State Coll., Ames, Iowa.

Hammatt, William Cushing.......Care, Mountain Copper Co., Keswick, Shasta Co., Cal.

Harwood, George Alec...........Asst. Engr., N. Y. C. & H. R. R. R., Room 700, Grand Central Station, New York City.

Huestis, Charles Calvin..........Secy. and Gen. Mgr., The T. H. Riddle Constr. Co., Ravenna, Ohio.

Janvrin, Ned Herbert........... 1037 Fourth St., Louisville, Ky.

Keays, Reginald Horton...... 22 Irving Pl., Albany, N. Y.

Knapp, Hermann Meriwether ....Contr. Mgr., Am. Bridge Co., 1304 Union Trust Bldg., Cincinnati, Ohio.

Millard, Charles Sterling.......Engr., M. of W., P. & E. Ry., Indianapolis, Ind.

Murphy, Edward Charles.........Engr., U. S. Geological Survey, 82 V St., Washington, D. C.

Rockwell, James Vincent.........Asst. Civ. Engr., U. S. N., U. S. Naval Academy, Annapolis, Md.

Sesser, John Cornelious..........Asst. Engr., C., B. & Q. R. R., Fulton, Ill.

Shima, Takejiro...................Bei Frau Büwendt, Goethestr., 13/I, Charlottenburg, Berlin, Germany.

Stevens, Perley Egbert..........497 Carroll St., St. Paul, Minn.

Wills, Arthur John............ . 27 Maryland Ave., Annapolis, Md.

ASSOCIATES.

Tomkins, Calvin............. .....17 Battery Pl., New York City.

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Belzner, Theodore...............Insp., Steel Constr., Manhattan Valley Viaduct, Rapid Transit R. R. Comm., 231 West 125th St. (Res., 584 Lenox Ave.), New York City.

Class, Charles Frank............Asst. Engr., Am. Coke & Gas Constr. Co., Camden, N. J.

Davis, George Jacob, Jr...........Care, N. B. Livermore, Rialto Bldg., San Francisco, Cal.

Gould, John Warren Du Bois.....Smith Creek Hotel, Mt. Hamilton, Cal.

Gray, John Colin.................Care, Bureau of Highways, Room 19, Municipal Bldg. (Res., 17 Lenox Rd.), Brooklyn, N. Y.

Harris, Henry Alexander.........Asst. Engr., Ferrocarril Central de Guatemala, Guatemala.

Hyatt, Caleb.....................Room 32, Union Station, Albany, N.Y.

Kimball, Ralph Charles..........Box 45, Owensville, Clermont Co., Ohio.

McHarg, Leslie ....159 Madison Ave., New York City.

Merz, Leon. ....1730 Memorial Ave., Philadelphia, Pa.

Miner, James Henry..............Engr., Page Coal & Coke Co., Elkhorn, W. Va.

Wilgus, Herbert Sedgwick.......Prin. Asst. Engr., Brooklyn Heights R.R. Co., 168 Montague St., Brooklyn, N.Y.

FELLOWS.

Green, Samuel Magee.............R. R. Contr., 740 Wells Bldg., Milwaukee, Wis.

DEATHS.

Abert, Sylvanus Thayer..........Elected Member September 21st, 1870; died August 11th, 1903.

Palmer, Cornelius................Elected Member November 2d, 1887; died July 31st, 1903.

Ware, Reuel Willard............Elected Member April 1st, 1874; died September 10th, 1903.

Watkins, John Elfreth. ....Elected Associate January 2d, 1889; died August 11th, 1903.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(September 9th to October 13th, 1903.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings*, Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
(7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine*, New York City, 25c.
(10) *Cassier's Magazine*, New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News*, New York City, 15c.
(14) *The Engineering Record*, New York City, 12c.
(15) *Railroad Gazette*, New York City, 10c.
(16) *Engineering and Mining Journal*, New York City, 15c.
(17) *Street Railway Journal*, New York City. 35c.
(18) *Railway and Engineering Review*, Chicago, Ill., 10c.
(19) *Scientific American Supplement*, New York City, 10c.
(20) *Iron Age*, New York City, 10c.
(21) *Railway Engineer*, London, England, 25c.
(22) *Iron and Coal Trades Review*, London, England, 25c.
(23) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal*, New York City, 10c.
(25) *American Engineer*, New York City, 20c.
(26) *Electrical Review*, London, England.
(27) *Electrical World and Engineer*, New York City, 10c.
(28) *Journal*, New England Water-Works Assoc., Boston, $1.
(29) *Journal*, Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
(31) *Annales de l' Assoc. des Ing. Sortis des École Spéciales de Gand*, Brussels, Belgium.
(32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
(33) *Le Génie Civil*, Paris, France.
(34) *Portefeuille Économique des Machines*, Paris, France.
(35) *Nouvelles Annales de la Construction*, Paris, France.
(36) *La Revue Technique*, Paris, France.
(37) *Revue de Mécanique*, Paris, France.
(38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
(39) *Railway Master Mechanic*, Chicago, Ill., 10c.
(40) *Railway Age*, Chicago, Ill., 10c.
(41) *Modern Machinery*, Chicago, Ill., 10c.
(42) *Transactions*, Am. Inst. Elec. Engrs., New York City, 50c.
(43) *Annales des Ponts et Chaussées*, Paris, France.
(44) *Journal*, Military Service Institution, Governor's Island, New York Harbor, 50c.
(45) *Mines and Minerals*, Scranton, Pa., 20c.
(46) *Scientific American*, New York City, 8c.
(47) *Mechanical Engineer*, Manchester, England.
(54) *Transactions*, Am. Soc. C. E., New York City, $5.
(55) *Transactions*, Am. Soc. M. E., New York City, $10.
(56) *Transactions*, Am. Inst. Min. Engrs., New York City, $5.
(57) *Colliery Guardian*, London, England.
(58) *Proceedings*, Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(59) *Transactions*, Mining Inst. of Scotland, London and Newcastle-upon-Tyne.
(60) *Municipal Engineering*, Indianapolis, Ind., 25c.
(61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburg, Pa.
(63) *Minutes of Proceedings*, Inst. C. E., London, England.
(64) *Power*, New York City, 20c.
(65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting*, London, England, 15c.
(67) *Cement and Engineering News*, Chicago, Ill., 25c.
(68) *Mining Journal*, London, England.
(69) *Mill Owners*, New York City, 10c.
(70) *Engineering Review*, New York City, 10c.
(71) *Journal*, Iron and Steel Inst., London England.

LIST OF ARTICLES.

Bridge.

The Mississippi River Bridges: Historical and Descriptive Sketch of the Bridges over the Mississippi River. F. B. Maltby. (4) Aug.

A Great Ferry Bridge.* (12) Aug. 28.

A Model Bridge and Construction Shop: Pennsylvania Steel Company's New Plant.* (20) Serial beginning Sept. 10; (14) Serial beginning Sept. 26.

The Viaur Viaduct on the Railway Line from Carmaux to Rodez, France.* René Bonnin. (13) Sept. 10.

Connel Ferry Railway Bridge.* (12) Sept. 11.

Engineering Aspects of the Kansas Floods.* Waddell & Hedrick. (14) Sept. 12; (13) Sept. 17; (15) Sept. 18.

Erection of the Girna Bridge, India.* (12) Serial beginning Sept. 25.

The Marietta Long-Span Highway Bridge.* (14) Serial beginning Sept. 26.

The Substructure of the Mingo Bridge over the Ohio River.* (14) Oct. 3.

The Method of Manufacturing the Large Eye-Bars for the Thebes Bridge. P. S. Hildreth. (13) Oct. 8.

The Pennsylvania Railroad Bridge over the Raritan River, at New Brunswick, N. J.* (14) Oct. 10.

The Ashland Avenue Bascule Bridge, Chicago.* (14) Oct. 10.

Note sur les Pièces Chargées de Bout Présentant Plus de Deux Points Fixés. F. Keelhoff. (31) Pt. 2, 1903.

Pont en Béton, sur le Neckar, près de Neckarhausen (Hohenzollern).* (35) Sept.

Passerelle en Béton Armé sur le Canal du Midi à Toulouse.* G. Espitallier. (33) Sept. 5.

Le Déplacement de la Passerelle de Passy sur la Seine, à Paris.* J. Feugères. (33) Sept. 19.

Electrical.

A High-Voltage Power Transmission.* M. H. Gerry, Jr., Assoc. M. Am. Soc. C. E. (54) Vol. 50.

The Calculator Board and Graphic Methods (electrical localization of faults in submarine cables).* (26) Aug. 28.

An Oil Engine Central Station.* Howard S. Knowlton. (26) Aug. 28.

Design for 1 H.-P. Self-Starting Single-Phase Induction Motor.* (Reprinted from the *American Electrician.*) (47) Aug. 29.

The Induction Motor and Its Engineering Capabilities.* George L. Hoxie. (3) Serial beginning Sept.

The Otis Elevator Company's Electric Elevator for Private Residences.* (Report of the Committee on Science and the Arts of the Franklin Inst.) (3) Sept.

Electric Lighting and Traction at Southend-on-Sea.* (26) Sept. 4.

On a New Method of Tuning Wireless Telegraph Stations by Means of the "Multiplier."* Count Arco. (26) Serial beginning Sept. 4.

The West Penn Railways and Lighting System.* (17) Sept. 5.

Central Avenue Power Station, Kansas City, Kan.* H. S. Badger and G. E. Schreiber. (27) Sept. 5.

Electrical Transmission from Boston. (27) Sept. 5.

Rise of Efficiency in Electric Stations. Alton D. Adams. (27) Sept. 5.

Isolated Plant *vs.* Central Stations Supply of Electricity: A Suggestion for Obtaining Estimates of Costs on a Competitive Basis. R. S. Hale. (27) Sept. 5.

An Object Lesson in Telephone Receivers.* Arthur V. Abbott. (27) Serial beginning Sept. 5.

Overhead Traction for Road Vehicles: The Stoll System.* (26) Sept. 11.

Power Plant of the Cambridge Electric Light Company, Cambridge, Mass.* (27) Sept. 12.

Tests of the Edison Storage Battery.* (27) Sept. 12.

Arrangement and Control of Long-Distance Transmission Lines. E. W. Cowan and L. Andrews. (Paper read before the Inst. of Elec. Engrs.) (47) Serial beginning Sept. 12.

Breakdowns of Electrical Machinery. Michael Longridge, M. Inst. C. E. (47) Sept. 12.

Portable Electric Light Plants.* Frank C. Perkins. (24) Sept. 14.

The Use of Aluminum as an Electrical Conductor. John B. C. Kershaw. (Paper read before the British Assoc. for the Advancement of Science.) (26) Sept. 18; (47) Oct. 3.

The New Electricity Works of the Manchester Corporation (Additional Notes).* (26) Sept. 18.

Evershed Testing Set.* (27) Sept. 19.

York Haven, Pa., Transmission Plant.* (27) Sept. 19.

The Electric Drive as Applied to Machine Tools, with Special Reference to Railroad Shops. C. H. Hines. (27) Sept. 19.

Fessenden's Work in Wireless Telegraphy.* A. Frederick Collins. (27) Sept. 19.

Electric Plant Failures: Their Origin and Prevention. A. C. Cormack. (From Paper read before the Inst. of Min. Engrs.) (24) Serial beginning Sept. 21.

On Three Phase Switch Gear.* A. C. Eborall. (11) Serial beginning Sept. 25.

The N. S. Secondary Cell.* (26) Sept. 25.

On Single-Phase Repulsion Motors.* William Cramp, A. M. I. E. E. (Paper read before the British Assoc. for the Advancement of Science.) (26) Serial beginning Sept. 25.

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* Illustrated.

Electrical—(Continued).

Motor-Generators and Rotary Converters.* H. M. Hobart. (26) Serial beginning Sept. 25.
A Notable Example of Central Station Supply of Electric Power and Light.* (14) Sept. 26.
Alternating Current Switchboards.* Stephen Q. Hayes. (27) Serial beginning Sept. 26.
Overhead Pole Line Construction and Operation for Central Stations. A. H. Manwaring and J. T. Hutchings. (Paper read before the Assoc. of Edison Illuminating Companies.) (27) Sept. 26.
Electric Trolley Vehicles without Rails.* Emil Guarini. (9) Oct.
Motor-Driven Machine Tools; Recent Practice in the Application of Electric Driving to Drilling Machinery.* (25) Oct.
Westinghouse Variable Speed Induction Motor.* (64) Oct.
The Parallel Working of Alternators. B. Hopkinson. (Paper read before the British Assoc. for the Advancement of Science.) (11) Oct. 2.
Protective Devices for High Tension Electrical Systems.* W. B. Woodhouse, A. M. I. Mech. E. (Paper read before the British Assoc. for the Advancement of Science.) (26) Oct. 2.
Armature Testing with a Milli-Voltmeter.* Cale Gough. (17) Oct. 3.
Electrical Supply in Fitchburg.* (27) Oct. 3.
A Proof of the Law for Grouping Cells to Obtain Maximum Current. E. Dana Pierce. (27) Oct. 3.
A Possible Source for Securing Wide Speed Range in Direct-Current Motors. Albert F. Hemingway. (27) Oct. 3.
Tests of Oerlikon Motor-Generator Sets for the Stockholm Central Station.* (27) Oct. 3.
On an Attempt to Construct an Electrostatic Transformer.* James Edmund Ives. (27) Oct. 10.
Three-Phase Power Measurements.* F. Hardie Jeannin. (27) Oct. 10.
Réaction d'Induit des Alternateurs. C. F. Guilbert. (36) Serial beginning Sept. 25.

Marine.

The New Graving Dock of the Kawasaki Dock Yard Co. at Kobe, Japan.* Genjiro Yamasaki. (13) Sept. 29.
Electrically Operated Floating Dry Dock.* Tom T. Donnelly. (27) Oct. 3.

Mechanical.

The Steel-Plant at Monterrey, Mexico.* William White, Jr. (56) Vol. 32.
Experiments and Observations in Soaring Flight.* Wilbur Wright. (4) Aug.
Centrifugal Fans. J. H. Kinealy. (70) Serial beginning Aug.
Entropy, or Thermodynamics from an Engineer's Standpoint. J. Swinburne. (11) Serial beginning Aug. 28.
Four-Cylinder Gas Engine.* (12) Aug. 28.
The Brotherhood Engine Works.* (26) Aug. 28.
An Oil Engine Central Station.* Howard S. Knowlton. (26) Aug. 28.
A Plea for Better Boiler Water. John H. Wynne. (39) Serial beginning Sept.
Modern High Speed Tool Steels.* H. M. Lane. (69) Sept.
A New System of Motor Traction.* A. W. Brightmore, M. Inst. C. E. (Paper read before the Liverpool Eng. Soc.) (47) Sept. 5.
Petroleum in California. Edmond O'Neill. (24) Sept. 7.
A Model Bridge and Construction Shop: Pennsylvania Steel Company's New Plant.* (20) Serial beginning Sept. 10; (14) Serial beginning Sept. 26.
Emery Wheel Practice in Foundries. Charles G. Smith. (Paper read before the Pittsburgh Foundrymen's Assoc.) (20) Sept. 10.
The Darlington Works of Robert Stephenson and Company.* (12) Serial beginning Sept. 11.
Paper Manufacture. Julius Hübner. (29) Serial beginning Sept. 11.
Tests of the Efficiency of Hoisting Tackle. S. L. Wonson. (14) Sept. 12.
The Mechanical Conveying of Coal and Coke.* Emile Guarini. (19) Serial beginning Sept. 12.
The Flying Machine and Its Slow Development. (From the *Public Ledger.*) (19) Sept. 12.
Recent Steam Turbine Developments. W. L. R. Emmet. (Paper read before the Amer. St. Ry. Assoc.) (27) Sept. 12; (17) Sept. 12; (26) Serial beginning Sept. 25.
The Mechanical Drying of Minerals. C. O. Bartlett. (Abstract of Paper read at Amer. Min. Cong.) (13) Sept. 17.
Gas Engine Principles and Management.* E. W. Roberts. (13) Sept. 17.
The Manufacture of Ethyl Alcohol from Wood.* (20) Sept. 17.
The Lefevre Four-Cylinder High Speed Engine.* (62) Sept. 17.
A Further Note on Gas-Engine Explosions. H. E. Wimperis, Assoc. M. Inst. C. E. (Paper read before the British Assoc.) (11) Sept. 18.
Cast Iron for Piston Rings. C. H. Wingfield. (Paper read before the British Assoc.) (11) Sept. 18.
Power Plant of the Rock Island—Lake Shore Terminal Station, Chicago.* (14) Sept. 19.
Hot-Water Heating in a Coal Country. Alton D. Adams. (14) Sept. 19.

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The Electric Drive as Applied to Machine Tools, with Special Reference to Railroad Shops. C. H. Hines. (27) Sept. 19.
Oil and Tar Burning on the Pacific Coast.* (24) Sept. 21.
Steel Building Construction in Gas-Works.* Saml. Cutler, Jr. (Paper read before the Eastern Counties Gas Mgrs. Assoc.) (66) Sept. 22.
The Resistance of Road Vehicles to Traction.* (Report of Committee of the British Assoc. for the Advancement of Science.) (11) Sept. 25.
Developments in Automobile Construction. T. Clarkson. (Paper read before the British Assoc. for the Advancement of Science.) (12) Serial beginning Sept. 25.
Emergency Fuels. (22) Sept. 25.
Engine Breakdowns. Michael Longridge, M. Inst. C. E. (47) Sept. 26.
Gas Engine Explosions. H. E. Wimperis, Assoc. M. Inst. C. E. (Paper read before the British Assoc. for the Advancement of Science.) (47) Sept. 26.
The Home of the Inclined Retort in England.* (66) Sept. 29.
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The Equipment of the Foundry.* Joseph Horner. (10) Oct.
Steam Waggons for Commercial Use.* R. G. L. Markham, M. Inst. M. E. (10) Oct.
Increasing the Coke Yield from Bee-Hive Ovens: Wastes in American Practice.* Charles Catlett. (10) Oct.
Motor-Driven Machine Tools; Recent Practice in the Application of Electric Driving to Drilling Machinery.* (25) Oct.
Portland Cement Manufacture: Preparation of Slag-Limestone Mixtures. Edwin C. Eckel. (60) Oct.
The Manufacture and Strength of Sand Brick. S. V. Peppel. (Abstract of article in *Trans.*, Amer. Ceramic Soc.) (60) Oct.
Difficulties in Making Clear Ice. William Kavanagh. (64) Oct.
Commercial Wrought Iron and Steel Pipe. Franklin Riffle, M. Am. Soc. C. E. (Paper read before the Pacific Coast Gas Assoc.) (13) Oct. 1; Abstract (20) Sept. 10.
Kilroy's Stoking-Indicators.* (11) Oct. 2.
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The California Asphaltum Industry.* F. H. Minard. (16) Oct 3.
European Floating and Dock Cranes.* Frank C. Perkins. (46) Oct. 3.
Horizontal Boring Machines.* Thomas R. Shaw. (47) Serial beginning Oct. 3.
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A Ten-Thousand-Horse-Power Chimney.* (14) Oct. 10.
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Curtis Steam Turbine.* Austin R. Dodge. (Abstract of Paper read before the New England Cotton Mfrs'. Assoc.) (17) Oct. 10; (27) Oct. 10.
Sur le Choix de l' Obliquité de la Ligne d' Engrénement pour les Engrenages à Développante: Considerations Theoriques et Pratiques.* Edmond Dubosc. (37) Aug.
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The Treatment of Clay-Slimes by the Cyanide Process and Agitation.* E. A. H. Tays and F. A. Schiertz. (56) Vol. 32.
An Adobe Reverberatory Furnace.* John Gross. (56) Vol. 32.
The Patio Process for Amalgamation of Silver-Ores. Manuel Valerio Ortega. (56) Vol. 32.
The Steel-Plant at Monterrey, Mexico.* William White, Jr. (56) Vol. 32.
The Mechanical Feeding of Silver-Lead Blast-Furnaces.* Arthur S. Dwight. (56) Vol. 32.
A Study of Amalgamation Methods, Especially the Patio Process, with the Object of Avoiding the Loss of Mercury. Miguel Bustamente, Jr. (56) Vol. 32.
Goldschmidt Method of Metallurgy and High Temperature Production by Means of Thermite. B. Palmer Caldwell. (1) Aug.
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Crystallization of Iron and Steel. (62) Serial beginning Sept. 17.
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The Making of 18-Inch Steel Eye-Bars. Wm. R. Webster, M. Am. Soc. M. E. (13) Oct. 8.
The Method of Manufacturing the Large Eye-Bars for the Thebes Bridge. P. S. Hildreth. (13) Oct. 8.
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A New Safety Explosive. Richard T. Dana, Assoc. M. Am. Soc. C. E. (54) Vol. 50.
The Latest Progress in Shaft Sinking.* Riemer. (Translated from the Report of the Eighth General German Min. Cong.) (6) Apr.
Report of the Royal Commission on Coal Supplies (Abstract).* (57) Serial beginning Aug. 28.
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Sinking and Equipping No. 9 Shaft, at Ashland Mine, of the Cleveland-Cliffs Iron Company, at Ironwood, Michigan.* H. F. Ellard. (Paper read before the Lake Superior Min. Inst.) (45) Oct; (13) Oct. 8.
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Some Notes on Train Resistance. C. F. Dendy Marshall. (12) Oct. 2.
Norfolk & Western Road Improvements.* Geo. L. Fowler. (15) Oct. 2.
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The Improved Harris Track-Laying Machine.* (18) Oct. 10.
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Tunnels for the New York City Terminus of the Pennsylvania and Long Island Railroads.* (14) Oct. 10.
La Traction Électrique et les Trains à Unités Multiples.* Jean de Traz. (32) Aug.
Simplon et Faucille: Rôle Économique d'une Nouvelle Ligne Internationale.* Louis Laffitte. (33) Serial beginning Aug. 29.
Des Relations d'Enclenchements à Distance entre les Postes ou Cabines par Desengageurs et Safety Locks.* M. Cuny. (38) Sept.
Note sur la Machine Compound à Train Articulé à 4 Cylindres et 12 Roues Accouplées de la Compagnie de Chemins de Fer Départementaux.* M. Comble. (38) Sept.
Les Locomotives à Voie Étroite.* Henry Martin. (33) Serial beginning Sept. 12.

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Production and Distribution of Alternating Current for Large City Systems.* Richard McCulloch. (Paper read before the Amer. St. Ry. Assoc.) (17) Sept. 12; Abstract (15) Oct. 2.
Power Plant of the Ottawa Electric Railway.* John Murphy. (27) Sept. 12.
Electric Welded Joints for Street Railway Tracks.* William Pestell. (Paper read before Amer. St. Ry. Assoc.) (17) Sept. 12; Abstract (13) Sept. 17.
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Sanitary.

The Sanitary Disposal of Municipal Refuse: An Informal Discussion.* (54) Vol. 50.
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Note on the Coefficient of Elasticity of Concrete and Mortar Beams during Flexure.* Myron S. Falk, Jun. Am. Soc. C. E. (54) Vol. 50.
A New Safety Explosive. Richard T. Dana, Assoc. M. Am. Soc. C. E. (54) Vol. 50.
The Preservation of Materials of Construction: An Informal Discussion.* (54) Vol. 50.
Sand-Blast Cleaning of Structural Steel.* George W. Lilly, Assoc. M. Am. Soc. C. E. (54) Vol. 50.
American Railway Engineering and Maintenance of Way Association: Specifications for Portland and Natural Cements and Portland Cement and Concrete. (67) Sept.
The Inspection of Materials. (12) Serial beginning Sept. 4.
The Value of White Paints on Engineering Structures. (12) Sept. 4.
Early Iron Building Construction.* (13) Sept. 10.
A Model Bridge and Construction Shop; Pennsylvania Steel Company's New Plant.* (20) Serial beginning Sept. 10; (14) Serial beginning Sept. 26.
Lacquers and Paints for Metals. (12) Serial beginning Sept. 11.
Concrete Blocks for Building.* (13) Sept. 17.
Structural Steel Work in the Macy Building, New York City.* (14) Sept. 19.
Steel Building Construction in Gas-Works.* Saml. Cutler, Jr. (Paper read before the Eastern Counties Gas Mgrs. Assoc.) (66) Sept. 22.
Pendulum Apparatus for Testing Steel as regards Brittleness.* E. G. Izod. (Paper read before the British Assoc. for the Advancement of Science.) (11) Sept. 25.
Mixing and Placing Concrete.* S. H. Lea, M. Am. Soc. C. E. (45) Serial beginning Oct.
The Twenty-three Story Land Title Building, Philadelphia, Pa.* (14) Serial beginning Oct. 3.
Some Methods and Costs of Concrete Mixing on the Buffalo, N. Y., Breakwater.* Emile Low, M. Am. Soc. C. E. (13) Oct. 8.
The New Building Regulations of New York City for Concrete-Steel Construction. (13) Oct. 8; (14) Oct. 10.
Laboratoire d'Essais du Conservatoire des Arts et Métiers: Section des Métaux.* P. Breuil. (33) Serial beginning Sept. 5.

Topographical.

Topographic Work in the Grand Canyon of the Gunnison. I. W. McConnell. (14) Oct. 3.

Water Supply.

Notes on the Potable Waters of Mexico. Ellen H. Richards. (56) Vol. 32.
A Small Rock-Fill Dam.* H. de B. Parsons, M. Am. Soc. C. E. (54) Vol. 50.

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The Filtration Works of the East Jersey Water Company, at Little Falls, New Jersey.* George W. Fuller, Assoc. M. Am. Soc. C. E. (54) Vol. 50.
Water Treatment in Railroad Operation. G. R. Henderson. (61) Sept.
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Further Results of the Water Waste Investigations in New York City. (14) Sept. 19: (13) Sept. 24.
Water-Powers in the South; with Especial Reference to Those of Northern Georgia in the Neighborhood of Gainesville and Dahlonega.* (45) Oct.
Commercial Wrought Iron and Steel Pipe. Franklin Riffle, M. Am. Soc. C. E. (Paper read before the Pacific Coast Gas Assoc.) (13) Oct. 1; Abstract (20) Sept. 10.
Intake Tunnel for the Champion Mill, at Painesdale, Mich.* F. W. O'Neil, Jun. Am. Soc. M. E. (Abstract of Paper presented before the Lake Superior Min. Inst.) (13) Oct. 1.
Progress Report of Commission on Additional Water Supply for New York City.* (13) Oct. 1.
The Correct Design and Stability of High Masonry Dams. Geo. Y. Wisner, M. Am. Soc. C. E. (Paper prepared for the 11th National Irrigation Cong.) (13) Oct. 1.
On the Nature and Quality of Some Potable Waters in South-West Lancashire. J. Campbell Brown. (Paper read before the British Assoc. for the Advancement of Science.) (11) Oct. 2.
Water-Softening Plant, Pennsylvania Co.* (15) Oct. 2.
Trial of a Diesel Oil Engine and Riedler Pump.* Michael Longridge, M. Inst. C. E. (47) Oct. 8.
Moving a 48-In. Force Main under Pressure at Philadelphia. Seth M. Van Loan, Jun. Am. Soc. C. E. (13) Oct. 8.
Some Points in the Design of Buckets for Impulse Water-Wheels.* (13) Oct. 8.
The Pecos Valley Aqueduct.* (40) Oct. 9.
Sand Washers at the Roxborough Filters, Philadelphia.* (14) Oct. 10.

Waterways.

The Economic Improvement of the Coosa and Alabama Rivers, in Georgia and Alabama.* D. M. Andrews, M. Am. Soc. C. E. (54) Vol. 50.
The Development of the Commerce of the Great Lakes. (Presidential Address at the Annual Convention of the Amer. Soc. of Civ. Engrs.) Alfred Noble, Pres. Am. Soc. C. E. (54) Vol. 50.
The Panama Canal.* George S. Morison, M. Am. Soc. C. E. (54) Vol. 50.
The Protection and Improvement of Foreshores by the Utilization of Tidal and Wave Action.* R. G. Allanson-Winn, M. Inst. C. E., Ireland. (54) Vol. 50.
An Alternative Line for the Nicaragua Canal; and a Proposed New Method of Dam Construction.* J. Francis Le Baron, M. Am. Soc. C. E. (54) Vol. 50.
Action of Sea Worms on Foundations in Boston Harbor.* F. W. Hodgdon. (1) Aug.
The Borings for the Bohio Dam for the Panama Canal.* R. C. Smith. (4) Aug.
Revolving Lanterns for Lighthouses.* (46) Sept. 26.
Controlling the Floods of the Mississippi River.* Lewis M. Haupt. (3) Oct.
Some Methods and Costs of Concrete Mixing on the Buffalo, N. Y., Breakwater.* Emile Low, M. Am. Soc. C. E. (13) Oct. 8.
Drague Marine Porteuse et à Refoulement pour les Ports de la Régence de Tunis.* Ch. Dantin. (33) Aug. 29.

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* Illustrated.

Vol. XXIX. NOVEMBER, 1903. No. 9.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

November 4th, 1903.—The meeting was called to order at 8.40 P. M., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 92 members and 16 guests.

The minutes of the meetings of October 7th and 21st, 1903, were approved as printed in *Proceedings* for October, 1903.

A paper, by Eugen Goetze, Esq., entitled "Filtration for Public Water Supplies, with Especial Reference to the Double Filtration Plant at Bremen, Germany," was presented by Rudolph Hering, M. Am. Soc. C. E. A communication on the subject from W. Kiersted, M. Am. Soc. C. E., was presented by the Secretary, and the paper was discussed verbally by Messrs. H. W. Underwood and Morris Knowles, who illustrated their remarks with lantern slides. Messrs. Allen Hazen, J. P. A. Maignen, George W. Fuller, William B. Fuller, John H. Gregory, George A. Soper and Thomas H. Wiggin also spoke on the subject

Ballots for membership were canvassed, and the following candidates elected:

As Members.

Burr Bassell, Kernville, Cal.
Kort Berle, Washington, D. C.
John Howard Clark, Malden, Mass.
Walter Edward Dauchy, Chicago, Ill.
John Rose Wilson Davis, Jersey City, N. J.
Charles Young Dixon, Amherstburg, Ont., Canada.
Howard Carleton Holmes, San Francisco, Cal.
Frank Gilbert Jonah, Alice, Tex.
Arthur Louis Phillips, Memphis, Tenn.
Ysidoro Ygnacio Polledo, Matanzas, Cuba.

As Associate Members.

Walter Hinds Allen, Brooklyn, N. Y.
Elmore David Cummings, Chicago, Ill.
Erastus Roland Simpson, Boston, Mass,
Frank Edward Winsor, New York City.

The Secretary announced the election of the following candidates by the Board of Direction, on November 3d, 1903:

As Associates.

William Clarence Olds, Erie, Pa.
Herbert Sedgwick Wilgus, Brooklyn, N. Y.

As Juniors.

Barnett Braslow, New York City.
Edward Merriam Chadbourne, San Francisco, Cal.
John Williams Doty, New York City.
Joseph Thomas Lillich, St. Louis, Mo.

The Secretary announced the death of Robert Henry Thurston, elected Member December 6th, 1871; died October 26th, 1903.

Adjourned.

November 18th, 1903.—The meeting was called to order at 8.40 P. M., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 102 members and 10 guests.

A paper, entitled "Dock Improvements at Liverpool," by George Cecil Kenyon, Assoc. M. Am. Soc. C. E., was presented by the Secretary.

The subject was discussed by the President.

The Secretary announced the death of NORMAN SMITH LATHAM, elected Junior July 3d, 1889; died November 10th, 1903.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

November 3d, 1903.—President Noble in the Chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Briggs, Craven, Croes, Jackson, Osgood, Pegram, Schneider, Swain and Wilgus.

A report was received from the Committee of Conference on the proposed Joint Engineering Building, and action was taken authorizing a statement of the matter, as it stands, to be issued to the membership sixty days before the Annual Meeting.

The proposition for the appointment of a Special Committee on Concrete and Steel-Concrete was considered, and a Committee of the Board appointed to prepare its recommendations for presentation to the Annual Meeting, together with a statement of the arguments for and against the appointment of such Committee.

Reconsideration Ballots were canvassed in accordance with the Constitution.

Applications were considered and other routine business transacted.

Two candidates for admission as Associate, and four as Junior, were elected.*

Adjourned.

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* See page 408.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, December 2d, 1903.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, entitled "A Desirable Method of Dredging Channels through River Bars," by S. Maximoff, Assoc. M. Am. Soc. C. E., will be presented for discussion.

This paper was printed in *Proceedings* for October, 1903.

Wednesday, December 16th, 1903.—8.30 P. M.—At this meeting, a paper, by Emile Low, M. Am. Soc. C. E., entitled "The Breakwater at Buffalo, N. Y.," will be presented for discussion.

This paper is printed in this number of *Proceedings.*

ANNUAL MEETING.

The Fifty-first Annual Meeting will be held at the Society House, January 20th and 21st, 1904. The Business Meeting will be called to order at 10 o'clock on Wednesday morning. The annual reports will be read, officers for the ensuing year elected, members of the Nominating Committee appointed, and other business transacted.

The arrangements for excursions and entertainments will be announced later.

NOMINATING COMMITTEE.

The Constitution provides that at the Annual Meeting of each year, seven Corporate Members, not officers of the Society, one from each of the geographical districts, into which the Society is divided for this purpose, shall be appointed by the meeting to serve for two years.

The usual blank request for suggestions as to representatives of each district, for presentation to the meeting, will soon be mailed to Corporate Members.

ANNUAL CONVENTION, 1904.

The Thirty-sixth Annual Convention will be held at St. Louis, Mo., during the week beginning October 3d, 1904.

As the details of the arrangements are developed, they will be announced in *Proceedings.*

UNIVERSAL EXPOSITION, ST. LOUIS, 1904.

The Society has undertaken to provide for an Engineering Exhibit, and the establishment of Headquarters for visiting engineers, and the Board of Direction has appropriated sufficient funds to defray the necessary expense.

This matter is in the hands of the following Committee:

ROBERT MOORE, M. Am. Soc. C. E., St. Louis, Mo., *Chairman*.
EDWARD C. CARTER, M. Am. Soc. C. E., Chicago, Ill.
MORDECAI T. ENDICOTT, M. Am. Soc. C. E., Washington, D. C.
JAMES L. FRAZIER, " " Frankfort, Ind.
WILLIAM JACKSON, " " Boston, Mass.
EMIL KUICHLING, " " New York, N. Y.
JOHN F. WALLACE, " " Chicago, Ill.
H. J. PFEIFER, Assoc. M. Am. Soc. C. E., St. Louis, Mo., *Secretary*.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction to the members who have made use of the resources of the Society in this manner has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared to the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

ACCESSIONS TO THE LIBRARY.

From October 14th to November 10th, 1903.

DONATIONS.*

GRAPHIC STATICS, WITH APPLICATIONS TO TRUSSES, BEAMS AND ARCHES.

By Jerome Sondericker. Cloth, 9 x 6 ins., 8 + 137 pp., illus. New York, John Wiley & Sons, 1903. $2.00.

This book is the outgrowth of an experience in teaching graphic statics at the Massachusetts Institute of Technology. While it deals specifically with problems encountered in building construction, it is intended to be serviceable to engineers and engineering students generally. As preparation, the author states that the reader should have a knowledge of statics and strength of materials, including beam stresses and deflections, as these subjects are commonly presented. An attempt has been made, in Chapter II, to develop a general method of dealing with frames where bending stresses occur in addition to tension and compression stresses. The Contents are: Introduction; Funicular Polygon; Forces in Equilibrium; Graphical Determination of Moments; Some Special Constructions for Funicular Polygons; Construction of Roofs, Loads, etc.; Determination of Reactions of Supports; Determination of Stresses; Counterbracing and Double Systems of Bracing; Three-Hinged Arch; Bending Stresses, Sway Bracing; Shearing Force and Bending Moment of Beams; Deflection of Beams; General Conditions of Stability of Masonry Arches, Abutments, etc.; Masonry Arch, Line of Pressure; Abutments, Piers, etc.

WATER POWER.

An Outline of the Development and Application of the Energy of Flowing Water. By Joseph P. Frizell, M. Am. Soc. C. E. Third Edition, Enlarged. Cloth, 9 x 6 ins., 6 + 646 pp., illus. New York, John Wiley & Sons, 1903. $5.00. (Donated by the Author.)

In this edition some typographical and numerical errors which had crept into former editions have been eliminated. The subject of dams on soft bottom has been extended, and a section added on dams in tidal waters. The length of wasteways in relation to the appurtenant drainage area has been more fully considered. The subject of tidal power has been outlined, and extended attention has been given to storage reservoirs. The subject of leases and rentals of water-power and land appurtenant thereto has also been more fully elaborated. The Contents are: Natural Watercourses; Dams for Water-Power; Construction of Dams; Dams of Masonry; Appendages of Dams; Movable Dams; Storage-Reservoirs and Reservoir Dams; Rock-Fill Dams; Reservoir Dams of Masonry; Examples of High Dams; Failures of High Dams; Canals, Gates, etc.; Hydraulic Motors; Water-Wheels; Turbines; Appendages and Attachments of Turbines; Canals; Development of Natural Water-Powers; Transmission of Power; Shafting and Wire Rope; Hydraulic Transmission; Transmission by Compressed-Air; Transmission by Electric Current; The Power-House; Measurement of Water; Storage and Pondage of Water; Damages to Mill-Owners Resulting from the Diversion of Water; Leases and Rentals of Water-Power; Testing Water-Wheels. There is an index of six pages.

PRINCIPLES OF AMERICAN FORESTRY.

By Samuel B. Green. Cloth, 7 x 5 ins., 13 + 334 pp., illus. New York, John Wiley & Sons, 1903. $1.50.

The author states that this is a book on elementary forestry, and has been prepared especially for students and others beginning this subject. It is also intended for the general reader who wishes to secure a general idea of the subject of forestry in North America. Much of the matter included herein was originally published by the Geological and Natural History Survey of Minnesota under the title "Forestry in Minnesota." In this volume the matter is treated in a more general way and has been enlarged upon the better to adapt it to the whole country. The chapter headings are: The Tree; Tree Growth; The Forest; Forest Influences; Tree Planting on Prairies; Forest Regeneration; Propagation; Nursery Practice; Forest Protection; Rate of Increase in Timber Trees; Forest Mensuration; Forest Problems; The Uses of Wood; Durability of Wood; Forest Economics; Tabular Classification, Sylvicultural Data, and Uses of Important American Timber Trees; Glossary of Technical Terms Used in Forestry; A List of the Best Books on Forestry; Publications of the Bureau of Forestry and Other U. S. Departments of Special Interest to Students. There is an index of twelve pages.

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* Unless otherwise specified, books in this list have been donated by the publishers.

NOTES ON ELECTRIC RAILWAY ECONOMICS AND PRELIMINARY ENGINEERING.

By W. C. Gotshall, M. Am. Soc. C. E., M. Am. Inst. E. E. Cloth, 9 x 6 ins., 5 + 251 pp., illus. New York, McGraw Publishing Company, 1903. $2.00.

This book is based upon a series of lectures delivered at Lehigh University, the subject of which dealt with the economics of the preliminary determinations and of the construction and operation of high-speed interurban electric railroads. The author has filled out the lecture notes, in some places adding matter thereto, and has arranged the subjects so as to follow the order in which they would be taken up in the investigation and construction of an electric railway undertaking of the type considered. With a few exceptions all the full-size original drawings and diagrams used in the lectures have been reproduced in this volume. Part of the book is devoted to a statement of the principles which should be followed in locating a proposed route so as to derive the maximum benefit from the territory to be served. The book is not designed as a treatise or exhaustive treatment of the subject as a whole, or of the details as indicated in the chapter headings. It is intended to "point the way," and embody some of the results of twelve years of practice and application. The Contents are: Introductory; Preliminary Office Determinations; Preliminary Field Survey; Detailed Office Investigation of Track Location; Preliminary Determination of Schedules and Equipment; Estimate of Earnings; Estimate of Probable Operating Expenses; The Final Survey; Track Construction; Overhead or Third-Rail Construction; The Power Station; Storage Batteries; Rolling Stock and Motors; Securing Rights of Way; Preparation of the Specifications; The Construction Period; The Organization of the Operating Department; Economic Considerations; Appendix. There is an index of three pages.

L. VICAT, SA VIE ET SES TRAVAUX.

Avec des Notes par Merceron-Vicat. Paper, 9 x 5 ins., 243 pp. Paris, Veuve Ch. Dunod, 1903. 3 francs, 50 centimes.

In this book M. Merceron-Vicat has recalled opportunely, at a time when the cement industry has become of considerable importance, the works of the creator of this new industry. The technical details are still of present-day interest and may be found useful by engineers and builders who are interested in hydraulic limes and cements. There is a short biographical notice followed by extracts showing L. Vicat's principal discoveries. The Contents are: Notice biographie; Chaux hydrauliques artificielles; Classification des chaux hydrauliques; Chaux-limites et incuits; Pouzzolanes artificielles; Ciments éventés et surcuits; Action de l'eau de mer; Délibération du Conseil municipal de Paris; Rapport d'Arago; Rapport de Thénard; Rapport de J. B. Dumas.

A MANUAL OF LAND SURVEYING.

Comprising an Elementary Course of Practice with Instruments and a Treatise upon the Survey of Public and Private Lands, Prepared for Use of Schools and Surveyors. By F. Hodgman. Morocco, 7 x 4 ins., 11 + 394 + 6 + 106 pp., illus. Climax, Michigan, F. Hodgman, 1903. $3.00.

This book contains the mathematical and instrumental matter usually found in text-books as well as a large amount of practical matter. It gives the United States laws relating to surveys and the latest United States Instructions to Deputy Surveyors. It tells how to subdivide sections of the United States Surveys and how to find lost corners and restore them when obliterated or destroyed. It also tells how descriptions in deeds are to be constructed and how to write correct descriptions. There are legal decisions and citations of more than two hundred cases from the highest courts in the United States, covering every point in the surveyor's practice which has been settled by them. In preparing this part of the work, every decision of the Supreme Court of the United States and of the Supreme Courts of the several States, which had a bearing on the surveyor's work, was consulted. The Contents are: Definitions; Instruments; Measurement of Angles; Passing Obstacles and Measuring Inaccessable Distances; Platting and Computing Areas; Curvelinear Surveying; Original Surveys; Subdivision of Sections; Resurveys; Relocating Lost Corners; Miscellaneous; Tables.

THE STAR IMPROVED STEAM ENGINE INDICATOR.

By Geo. H. Barrus, M. Am. Soc. M. E. Cloth, 7½ x 5 ins., 140 pp., illus. Boston, Star Brass Mfg. Co. $1.00.

The preface states that although in a sense an advertisement of the new indicator, this book is intended to be an unbiased statement of all the facts needed by a purchaser of this indicator, whether unfamiliar with the particular form of instrument described, or with the general subject. It is intended also as a useful book of reference and instruction in the practical work of indicating. Most of the diagrams here reproduced were taken for the purpose of this treatise, using one of the new type of instruments, and nearly all were taken by the author. The Contents are: Introduction; Description of the Star Improved Indicator; Testing Springs; Care of the Star Improved Indicator; Diagrams Taken from the Star Improved Indicator; How to Indicate an Engine; How to Take a Diagram; Designation of the Various Lines of the Diagram; Use of the Indicator for Setting Valves; Working up Diagrams, Use of the Planimeter, etc.; Computation of Horse-Power; Steam Accounted for by Indicator Diagram; Cylinder Condensation and Leakage; Combining Diagrams; Steam-Pipe Diagrams; Leakage-Tests of Valves and Pistons; Tables.

CURVES OF CIVIL ENGINEERING.

The Transitman's Pocket Companion. Containing Instructions for Surveys to Locate the Center Line of Engineering Works, and Tables that are Needed in the Field, in Connection with Circular, Transition and Vertical Curves. By Arthur M. Haynes. Leather, 7 x 4 ins., 117 pp., illus. 1903. $2.50. (Donated by the Author.)

The author states in the preface that the excuse for this book is to advocate *arc* measurements. A new table of 1° curve functions is given, in accordance with a new definition for "degree of curve," found in the first paragraph of the text. Logarithms and tables of natural functions are not given because the author thinks they should not be used in the field. Special problems, too, are considered as belonging in the class-room. The subject of transition curves is made a prominent feature. A section on vertical curves is added, so that the ground may be better covered. While this subject applies especially to railroads it should also be applied to city street grades much more than it is. The Contents are: Circular Curves; Alignments of Engineering Works; Linear Measurements; General Discipline; Angular Measurements; True Meridian; Field Work; Transition Curves; Platting; Turnout Curves; Vertical Curves; Tables and Diagrams.

AMERICAN RAILWAY TRANSPORTATION.

By Emory R. Johnson. Cloth, 8 x 5 ins., 16 + 434 pp., illus. New York, D. Appleton and Company, 1903. $1.50.

This volume, as is stated in the introductory chapter, is concerned with the transportation service performed by steam or trunk-line railroads. It does not discuss the engineering and other technical questions of railroad construction and operation, but describes the American railroad system, gives an account of the service performed by the different branches of the railroad organization, considers the business relations of the railroads and the public, and discusses the problems of government regulation. The book is intended as a study in railway economics and as an introduction to the general subject of railroad transportation. The chapter headings are: Introduction—Definition and Scope of Transportation; Origin of the American Railway; Growth of the American Railway Net; The Mechanism of the Railway; The Present Railway System of the United States; The Railway Corporation and its Charter; Railway Capital; Earnings, Expenses, and Dividends; The Freight Service; The Passenger Service; The Express Service of the Railways; The Mail Service of the Railways; The Organization of the Service; The Accounts and Statistics of the Railway Service; Railway Competition and Agreements to Maintain Rates; Pools and Traffic Associations; The Present Situation; Monopoly and Competition in the Railway Service; Theory of Rates and Fares; Rate-Making in Practice; Railway Charges in the United States and other Countries; Public Aid to Railway Construction; Relation of the Railways to the State in the United Kingdom and France; Relations of the Railways and the State in Italy and Germany; Regulation of Railways by the American State Governments; Railway Regulation by the Federal Government; The Courts and Railway Regulation; Railway Taxation; The Problem of Government Regulation. There is an index of six pages.

AMERICAN RAILWAYS.

By Edwin A. Pratt. Reprinted (with additions) from *The Times*. Cloth, 8 x 5 ins., 8 + 307 pp. New York, The Macmillian Company, 1903. $1.25.

The facts here given were collected during a four months tour of the United States, made in the winter of 1902-3, and representing a total about 9 000 miles of railway traveling on the American continent. While seeking to put before the representatives of railway interests in England a certain amount of practical information which might be of service to them, the author has also aimed at interesting the general reader in the subject of American railways, in regard alike to their origin, their characteristics, and their operation. He has also incorporated some references to the present-day expansion of those agricultural, industrial, and commercial interests of the United States to which, more than to passenger traffic, the railways of the United States are indebted for their prosperity. The chapter headings are: A General Survey; Some Points of Difference; The Growth of Freight; Wagons and Locomotives; The Passenger Business; On the Cars; The Pittsburg Block; Track Elevation in Chicago; Across the

Prairies; In the Rockies; A Mining Camp Railway in Chicago; The Santa Fé Trail; The Trans-Continental Traffic; Gardens, Deserts, and the New Galveston; Progress in the South; The North-West and Its Story; The New England States; Railway Accidents in the United States.

FOWLER'S MECHANICAL ENGINEER'S POCKET BOOK, 1904.

Edited by William H. Fowler, M. Inst. C. E., M. I. Mech. E. Leatherette, 6 x 4 ins., 95 + 441 pp., illus. Scientific Publishing Co., Manchester. 1 shilling, 6 pence, net.

Advantage has again been taken in the preparation of the 1904 edition of this pocket-book to revise its contents in order to bring the matter up to date and correct any typographical errors not previously detected. In several directions this work of revision and addition has assumed considerable dimensions, and it is hoped that it will prove of corresponding value. The section on gas engines has been largely rewritten with the intention of making it of special value to all interested in gas engine design and practice. There is an index of seventeen pages.

Gifts have also been received from the following:

Ala.—Geological Surv. 1 pam.
Albemarle & Chesapeake Canal Co. 1 bound vol.
Am. Ry. Master Mechanics' Assoc. 1 bound vol.
Am. St. Ry. Assoc. 1 vol.
Am. Water-Works Assoc. 1 vol.
Architekten-Verein zu Berlin. 2 pam.
Atlanta & West Point R. R. Co. 1 pam.
Boston, Mass.—Pub. Lib. 1 vol.
Buffalo, Rochester & Pittsburgh Ry. Co. 1 pam.
Butler, D. B. 1 pam.
Canadian Pacific Ry. Co. 1 pam.
Cantor, Jacob A. 2 pam.
Central of Georgia Ry. Co. 1 pam.
Central R. R. Co. of N. J. 1 pam.
Chicago & Alton Ry. Co. 1 pam.
Chicago, Burlington & Quincy R. R. Co. 1 pam.
Chicago, Milwaukee & St. Paul Ry. Co. 1 pam.
Chicago, Rock Island & Pacific Ry. Co. 1 pam.
City Record. 2 bound vol.
Cleveland, Cincinnati, Chicago & St. Louis Ry. Co. 1 pam.
Colby, Albert Ladd. 1 pam.
Colorado & Southern Ry. Co. 1 pam.
Conn.—Agri. Exper. Station. 1 pam.
Corthell, E. L. 1 bound vol.
Crandall, C. L. 1 pam.
Denver & Rio Grande R. R. Co. 2. pam.
Detroit, Mich.—Dept. of Pub. Works. 1 bound vol.
Duluth, Minn.—City Officers. 1 vol.
Eng. Soc. Polytechnic Inst. of Brooklyn. 1 bound vol.
Eng. Soc. School of Practical Sci., Toronto. 2 vol.
Erie R. R. Co. 1 pam.
Fisk, W. L. 2 pam., 1 map.
Fitchburg, Mass.—City Clerk. 16 bound vol., 2 vol.
Fort Worth & Denver City Ry. Co. 1 pam.
Grand Rapids, Mich.—City Engr. 1 pam.
Great Britain—Patent Office. 7 vol., 4 pam.
Great Northern Ry. Co. 2 pam.
Griggs, Julian. 1 pam.
Hawaii—Territorial Meteorologist. 4 pam.
Ill.—R. R. & Warehouse Comm. 1 map.
Ill. Soc. of Engrs. and Surv. 1 vol.
Inst. of Civ. Engrs. 1 bound vol., 2 vol.
Iowa—Geological Surv. 1 bound vol.
Journal of the U. S. Artillery. 1 pam.
Lake Mohonk Conference on International Arbitration. 1 pam.
Lehigh Valley R. R. Co. 3 pam.
Louisville & Nashville R. R. Co. 1 pam.
Maine—State Board of Health. 6 bound vol., 5 vol.
Md.—State Board of Health. 4 vol.
Mass.—Bureau of Statistics of Labor. 2 bound vol.
Mead, Elwood. 1 bound vol.
Montclair, N. J.—Board of Health. 1 pam.
Montreal, Que.—Supt. of Water-Works. 1 pam.
N. H.—R. R. Commrs. 5 vol.
N. J.—Geological Surv. 1 pam.
New London, Conn.—Board of Water Commrs. 1 pam.
N. Y.—Commr. of the State Reservation at Niagara. 5 pam.
N. Y.—Comptroller. 7 bound vol., 24 pam.
N. Y.—Forest, Fish & Game Comm. 1 pam.
N. Y.—Pub. Lib. 1 pam.
New York Central & Hudson River R. R. Co. 1 pam.
New York, New Haven & Hartford R. R. Co. 2 pam.
New York, Ontario & Western Ry. Co. 2 pam.
New York, Susquehanna & Western R. R. Co. 1 pam.
Norfolk, Va.—Board of Water Commrs. 1 pam.
North of England Inst. of Min. and Mech. Engrs. 1 pam.
North-East Coast. Inst. of Engrs. and Shipbuilders. 1 bound vol.
Ogdensburg, N. Y.—City Clerk. 1 pam.
Ohio—Commr. of Railroads & Telegraphs. 1 bound vol.
Parsons, Wm. Barclay. 2 bound vol.
Queensland—Commr. for Rys. 1 pam.
Reading Co. 2 pam.
Rock Island Co. 1 pam.
Ruttan, H. N. 1 pam.
Santa Fé, Prescott & Phœnix Ry. Co. 1 pam.
Smithsonian Inst. 2 bound vol.
Southern Ry. Co. 2 pam.
Spring, F. J. E. 1 pam.

Thompson, R. A. 1 pam.
Tombo, Carl. 3 pam.
U. S. Bureau of Statistics. 1 vol.
U. S. Chf. of Engrs. 14 specif.
U. S. Dept. of Agri. 1 pam.
U. S. Geological Surv. 1 pam.
U. S. Interstate Commerce Comm. 1 bound vol., 3 vol.
U. S. War Dept. 2 vol.
Univ. of Ariz. 1 pam.
Univ. of Ill. 1 bound vol.
Univ. of Pa. 1 vol.
Western Ry. of Alabama. 1 pam.
Wilmington, Del.—Board of Health. 1 pam.
Wis.—State Board of Health. 3 bound vol., 2 vol., 3 pam.
Yonkers, N. Y.—Dept. of Pub. Works. 1 pam.

BY PURCHASE.

Continuous Current Dynamos and Motors and their Control. Being a Series of Articles Reprinted from *The Practical Engineer*, and completed by W. R. Kelsey. London, The Technical Publishing Company, Limited, 1903.

Electrical Influence Machines; Their Historical Development and Modern Forms, with Instructions for Making Them. By John Gray. Second Edition, Revised and Enlarged. New York, D. Van Nostrand Company, 1903.

Das Elektrische Kabel. Eine Darstellung der Grundlagen für Fabrikation, Verlegung und Betrieb. Von C. Baur. Berlin, Julius Springer, 1903.

Modern Practical Electricity. Electricity in the Service of Man. A Popular and Practical Treatise on the Applications of Electricity in Modern Life. By R. Mullineux Walmsley. Vol. 1-3. Chicago, W. T. Keener & Co.

The "Engineering" and Electric Traction Pocket-Book. By Philip Dawson, Assoc. M. Inst. C. E., M. I. Mech. E., M. I. E. E. London, Offices of "Engineering." New York, John Wiley and Sons, 1903.

Mechanics of Engineering. Theoretical Mechanics, with an Introduction to the Calculus. Designed as a Text-Book for Technical Schools and Colleges, and for the Use of Engineers, Architects, etc. By Julius Weisbach. Translated from the Fourth Augmented and Improved German Edition, by Eckley B. Coxe. Ninth American Edition. New York, D. Van Nostrand Company, 1899.

Mechanics of Engineering and of Machinery. By Julius Weisbach. Vol. II, Section II, Part II, Translated from the Fourth Augmented and Improved German Edition by A. Jay Du Bois, with Additions Showing American Practice by R. H. Buel; Vol. III, Pt. I, Sections I-II, Second Edition, Thoroughly Revised and Enlarged by Gustav Herrmann, Translated by J. F. Klein. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1896-1902.

The Gas-Engine. A Treatise on the Internal-Combustion Engine Using Gas, Gasoline, Kerosene, or other Hydrocarbon as Source of Energy. By Frederick Remsen Hutton. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1903.

The Practical Physics of the Modern Steam Boiler. By Frederick J. Rowan, A. M. Inst. C. E., M. I. E. S. With a Preface by Prof. R. H. Thurston. New York, D. Van Nostrand Company, 1903.

Lead-Smelting. The Construction, Equipment and Operation of Lead Blast Furnaces, and Observations on the Influence of Metallic Elements on Slags and the Scientific Handling of Smoke. By Malvern Wells Iles. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1902.

The Mineral Industry; Its Statistics, Technology and Trade in the United States and other Countries to the End of 1902. Founded by the late Richard P. Rothwell. Edited by Joseph Struthers. Vol. XI Supplementing Volumes I to X. New York and London, *The Engineering and Mining Journal*, 1903.

House Drainage Manual. A Guide to the Design and Construction of Systems of Drainage and Sewage Disposal from Houses. By Wm. Spinks, Assoc. M. Inst. C. E. Second Edition, Revised and Extended by E. H. Blake. With Tables, Illustrations, Extracts from Public Health Acts, Metropolis Management Acts, and Model By-Laws Relating to House Drainage. Biggs & Co., London; D. Van Nostrand Company, New York, 1903.

Die Angewandte Elastizitäts- und Festigkeitslehre. Auf Grund der Erfahrung bearbeitet von L. v. Tetmajer. Zweite, vollständig umgearbeitete Auflage. Leipzig und Wien, Franz Deuticke, 1904.

Die Gesetze der Knickungs- und der Zusammengesetzten Druckfestigkeit der technisch wichtigsten Baustoffe. Bearbeitet von L. v. Tetmajer. Dritte vervollständigte Auflage. Leipzig und Wien, 1903.

SUMMARY OF ACCESSIONS.

October 13th to November 10th, 1903.

Donations (including 10 duplicates)	230
By purchase	16
Total	246

MEMBERSHIP.

ADDITIONS.

MEMBERS.

		Date of Membership.
Bennett, Frederick Wagoner. Cape May Court House, N. J.		Oct. 7, 1903
Berle, Kort. Brookland, D. C.	Assoc. M.	Dec. 6, 1899
	M.	Nov. 4, 1903
Colby, Albert Ladd. Care, International Nickel Co., 43 Exchange Pl., New York City		Oct. 7, 1903
Dauchy, Walter Edward. Supt., Heating Dept., Erie City Iron Works, 7153 Princeton Ave., Chicago, Ill.		Nov. 4, 1903
Davis, John Rose Wilson. Engr., M. of W., G. N. Ry., Merchants' Hotel, St. Paul, Minn.		Nov. 4, 1903
Harahan, William Johnson. Asst. Gen. Mgr., Ill. Cent. R. R., Chicago, Ill.	Assoc. M.	Oct. 3, 1894
	M.	Oct. 7, 1903
Hollyday, Richard Carmichael. Engr. in Chg., New York Navy Yard, Brooklyn, N. Y.		Sept. 2, 1903
Johnson, Chapman Love. Superv. Engr., McDonough Constr. Co., Tomhannock, N. Y.		Oct. 7, 1903
Matheson, Donald Alexander. Engr., Caledonian Ry., Buchanan St. Station, Glasgow, Scotland		Oct. 7, 1903
Patrick, Mason Mathews. Instr. of Practical Military Eng., U. S. Military Academy, West Point, N. Y.		Oct. 7, 1903
Phillips, Arthur Louis. Asst. Chf. Engr., Chic., St. L., Memphis & N. O. R. R., 536 Randolph Bldg., Memphis, Tenn.		Nov. 4, 1903
Shearwood, Frederick Perry. Care, Dominion Bridge Co., Lachine Locks, Que., Canada		Oct. 7, 1903
Tucker, Ross Francis. Pres., Tucker & Vinton, 156 Fifth Ave., New York City		Oct. 7, 1903
Whistler, John T. U. S. Geological Survey (Res., 1823 Kalorama Ave.), Washington, D. C	Assoc. M.	Jan. 2, 1901
	M.	Oct. 7, 1903

ASSOCIATE MEMBERS.

Beerbower, George Marshall. Engr., N. Y. Zoological Society, 183d St. and Southern Boulevard, New York City		Oct. 7, 1903
Cunningham, John Miller. West Pittsburg, Lawrence Co., Pa.		Oct. 7, 1903
Drew, Charles Davis. 6 Kirkland Rd., Cambridge, Mass.		Oct. 7, 1903
Harby, Isaac. Civ. Engr. with John A. Roebling's Sons Co., 301 Spring St., Trenton, N. J.	Jun.	June 6, 1899
	Assoc. M.	May 6, 1903
Hengst, Robert Graham. Asst. Chf. Engr., West. Allegheny R. R. Co., 301 Smithfield St., Pittsburg, Pa.		Oct. 7, 1903

		Date of Membership.
Monsarrat, Nicholas Daubeney. Chf. Engr., Sunday Creek Coal Co., 432 E. Broad St., Columbus, Ohio	Jun. Assoc. M.	Feb. 5, 1895 Sept. 2, 1903
Winsor, Frank Edward. 367 Boylston St., Boston, Mass		Nov. 4, 1903

ASSOCIATES.

Wilgus, Herbert Sedgwick. Prin. Asst. Engr., The Brooklyn Heights R. R. Co., 166 Montague St., Brooklyn, N. Y	Jun. Assoc.	Oct. 1, 1901 Nov. 3, 1903

JUNIORS.

Braslow, Barnett. 59 East 115th St., New York City	Nov. 3, 1903
Cameron, Kenneth Mackenzie. Chf. Engr.'s Office, Canadian Pacific Ry., Windsor St. Station, Montreal, Que., Canada	Oct. 6, 1903
Cooper, Kenneth Farra. Smith Creek, via San José, Cal	Oct. 6, 1903
Doty, John Williams. Care, Foundation & Contr. Co., 35 Nassau St., New York City	Nov. 3, 1903
Hanna, Walter Scott. Care, The Am. Pipe Mfg. Co., 112 North Broad St., Philadelphia, Pa.	Oct. 6, 1903
Hoyt, Henry Perez. Asst. Engr., Great Northern Paper Co., Millinocket, Me	Oct. 6, 1903
Ireland, Mark Lorin. Ordnance Office, War Dept., Washington, D. C	Oct. 6, 1903
Lillich, Joseph Thomas. 514 Rialto Bldg., St. Louis, Mo.	Nov. 3, 1903
McCrory, Sol. Box 254, Shreveport, La	Oct. 6, 1903
Polk, Armour Cantrell. 20 West 34th St., New York City.	Oct. 6, 1903
Porter, John Endicott. Vilas, Pa	Sept. 1, 1903
Sawyer, Wilbur Cyrus. Care, U. S. Geological Survey, Washington, D. C	Oct. 6, 1903
Schmid, Francis Rauch. 30 Wall St., Bethlehem, Pa	Oct. 6, 1903
Straiton, Charles Heywood. 195 Hanover St., Annapolis, Md	Oct. 6, 1903

CHANGES OF ADDRESS.

MEMBERS.

Andersen, Christian	P. O. Box 532, Spokane, Wash.
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Appleton, Thomas	Supt. of Constr., Public Bldgs., Holyoke, Mass.
Davis, Arthur Powell	Superv. Engr., U. S. Reclamation Service, Phœnix, Ariz.
Edwards, Harry Winter	Care, Chihuahua & Pacific R. R., Apartado 46, Chihuahua, Mexico.
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TUCKEY, THOMAS WILLIAM TOWNSEND....Dist. Engr., Imperial Rys. of North China, Tientsin, North China.

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Coverdale, William Hugh .... 9 West 30th St., New York City.
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Lindsey, John Brown, Jr .... Supt., West Pascagoula Creosote Works, Gautier, Miss.
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Mesa, Antonio Esteban .... Animas 100, Havana, Cuba.
Osbourn, Henry Van Buren. .... Tucson, Ariz.
Roy, Robert Maitland .... 270 Main St., West, Hamilton, Ont., Canada.
Shima, Takejiro. .... Bei Frau Bierwagen, Bayreüther Str. 27/h, Berlin, W., Germany.
Strawn, Thomas Corwin .... 211 West 101st St., New York City.
Tompkins, Edward De Voe .... 63 West 56th St., New York City.
Webb, Walter Loring .... Cons. Engr., 810 Girard Bldg., Philadelphia, Pa.
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Wilson, Henry Felix, Jr .... Civ. and Min. Engr., 204 First National Bank Bldg., Birmingham, Ala.

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Turrill, Sherman Marsh .... 114 Willoughby St., Brooklyn, N. Y.
Young, Charles Griffith .... Care, J. G. White & Co., 43 Exchange Pl., New York City.

JUNIORS.

Crawford, Joseph Emmanuel .... Hotel Roanoke, Roanoke, Va.
Hammer, Robert Henry .... 205 Congress St., Brooklyn, N. Y.
Harshbarger, Elmer Dwight .... Care, Chic. & East. Ill. R. R. Co., Ogden, Ill.
Lindsey, Kieffer .... Box 74, Station W, Brooklyn, N. Y.
Miner, James Henry .... Draftsman, C., R. I. & P. Ry., 299 La Salle Ave., Chicago, Ill.

Paine, George Hebard................Cons. Engr., 8th Floor, St. Paul Bldg., New York City.

Pearse, Langdon.......................Box 203, Augusta, Me.

Rohnert, Benno ....U. S. Asst. Engr., Amherstburg, Ont., Canada.

Shryock, Joseph Grundy..............Care, Virginia Bridge & Iron Co., Roanoke, Va.

Spencer, Louis Bernard..............Box 487, Ogden, Utah.

Van Pelt, Sutton.......................Care, U. S. Engr. Office, Tuscaloosa, Ala.

Weller, Francis Repetti.............1416 F St., Washington, D. C.

Wilhelm, Jerome Frederick..........Traverse City, Mich.

FELLOWS.

Adams, Edward Dean..................455 Madison Ave., New York City.

DEATHS.

Greene, Charles Ezra.................Elected Member, January 4th, 1882; died October 17th, 1903.

Thurston, Robert Henry............Elected Member, December 6th, 1871; died October 25th, 1903.

Latham, Norman Smith...............Elected Junior, July 3d, 1889; died November 10th, 1903.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(October 14th to November 10th, 1903.)

Note.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings*, Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
(7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine*, New York City, 25c.
(10) *Cassier's Magazine*, New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News*, New York City, 15c.
(14) *The Engineering Record*, New York City, 12c.
(15) *Railroad Gazette*, New York City, 10c.
(16) *Engineering and Mining Journal*, New York City, 15c.
(17) *Street Railway Journal*, New York City, 35c.
(18) *Railway and Engineering Review*, Chicago, Ill., 10c.
(19) *Scientific American Supplement*, New York City, 10c.
(20) *Iron Age*, New York City, 10c.
(21) *Railway Engineer*, London, England, 25c.
(22) *Iron and Coal Trades Review*, London, England, 25c.
(23) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal*, New York City, 10c.
(25) *American Engineer*, New York City, 20c.
(26) *Electrical Review*, London, England.
(27) *Electrical World and Engineer*, New York City, 10c.
(28) *Journal*, New England Water-Works Assoc., Boston, $1.
(29) *Journal*, Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
(31) *Annales de l' Assoc. des Ing. Sortis des École Spéciales de Gand*, Brussels, Belgium.
(32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
(33) *Le Génie Civil*, Paris, France.
(34) *Portefeuille Économique des Machines*, Paris, France.
(35) *Nouvelles Annales de la Construction*, Paris, France.
(36) *La Revue Technique*, Paris, France.
(37) *Revue de Mécanique*, Paris, France.
(38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
(39) *Railway Master Mechanic*, Chicago, Ill., 10c.
(40) *Railway Age*, Chicago, Ill., 10c.
(41) *Modern Machinery*, Chicago, Ill., 10c.
(42) *Transactions*, Am. Inst. Elec. Engrs., New York City, 50c.
(43) *Annales des Ponts et Chaussées*, Paris, France.
(44) *Journal*, Military Service Institution, Governor's Island, New York Harbor, 50c.
(45) *Mines and Minerals*, Scranton, Pa., 20c.
(46) *Scientific American*, New York City, 8c.
(47) *Mechanical Engineer*, Manchester, England.
(54) *Transactions*, Am. Soc. C. E., New York City, $5.
(55) *Transactions*, Am. Soc. M. E., New York City, $10.
(56) *Transactions*, Am. Inst. Min. Engrs., New York City, $5.
(57) *Colliery Guardian*, London, England.
(58) *Proceedings*, Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(59) *Transactions*, Mining Inst. of Scotland, London and Newcastle-upon-Tyne.
(60) *Municipal Engineering*, Indianapolis, Ind., 25c.
(61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburg, Pa.
(63) *Minutes of Proceedings*, Inst. C. E., London, England.
(64) *Power*, New York City, 20c.
(65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting*, London, England, 15c.
(67) *Cement and Engineering News*, Chicago, Ill., 25c.
(68) *Mining Journal*, London, England.
(69) *Mill Owners*, New York City, 10c.
(70) *Engineering Review*, New York City, 10c.
(71) *Journal*, Iron and Steel Inst., London, England.

LIST OF ARTICLES.

Bridge.

The Burnett and Kennedy Bridges, Bundaberg, Queensland.* Alfred Joseph Goldsmith M. Inst. C. E. (63) Vol. 153.

Building the Cabul River Bridge in India. (14) Oct. 17.

The Adda Railway Bridge in Italy.* (14) Oct. 17.

The Concrete Viaduct near Riverside, Cal.; San Pedro, Los Angeles and Salt Lake R. R. A. C. Ostrom. (13) Oct. 22.

A Novel Type of Drawbridge.* (13) Oct. 22.

Novel Method of Erection Adopted for the Frans Bridge at Villefranche over the Saône.* (13) Oct. 22.

A New High Level Bridge over the River Tyne at Newcastle, on the Northeastern Railway of England.* F. E. Harrison. (40) Oct. 23.

A Movable Railway Incline Bridge at New Orleans.* (14) Oct. 24.

Falsework for Rocky Bottoms in Rapid Currents.* (Abstract of Report of a Committee to the Assoc. of Ry. Supts. of Bridges and Bldgs.) (18) Serial beginning Oct. 24.

Flood Damage to Bridges at Paterson, N. J.* (13) Oct. 29.

Methods of Making Annual Inspection of Bridges and Culverts. (Abstract of Report of Committee of the Assoc. of Ry. Supts. of Bridges and Bldgs.) (13) Oct. 29.

The Kansas City Flow-Line Bridge Repairs.* J. A. L. Waddell, M. Am. Soc. C. E. (13) Oct. 29; (14) Oct. 31; (15) Oct. 30.

Temporary Arrangement to Carry Traffic where One Arm of a Drawbridge is Wrecked.* (Abstract of Report of a Committee to the Assoc. of Ry. Supts. of Bridges and Bldgs.) (18) Oct. 31.

A Concrete Arch Bridge near Mechanicsville, N. Y.* (13) Nov. 5.

Erection of the Grand Rapids Bridge.* (14) Nov. 7.

Calcul d'un Arc de Forme Quelconque: Exposé de la Méthode de de Dion dans Toute Sa Généralité Suivi d'une Application Numérique.* L. Lemaire. (30) Oct.

Reconstruction du Pont de Frans sur la Saône, à Villefranche.* (33) Oct. 31.

Electrical.

Reverse Current Circuit Breakers and the Protection of Transmission Lines.* Leonard Wilson. (42) Aug.

Methods of Bringing High Tension Conductors into Buildings.* C. E. Skinner. (42) Aug.

The Grounded Wire as a Protection against Lightning. Ralph D. Mershon. (42) Aug.

The Testing of Electrical Apparatus for Dielectric Strength. P. H. Thomas. (42) Aug.

Choice of Frequency for Very Long Lines. P. M. Lincoln. (42) Aug.

Y or Δ Connection of Transformers.* F. A. Blackwell. (42) Aug.

Electric Cables for High Voltage Service. Henry W. Fisher. (42) Aug.

The Operation and Maintenance of High-Tension Underground Systems.* Philip Torchio. (42) Aug.

The Use of Automatic Means for Disconnecting Disabled Apparatus. H. G. Stott. (42) Aug.

Storage Battery Industrial Locomotives.* F. L. Sessions. (42) Aug.

Energy Transformations in the Synchronous Converter. Wm. S. Franklin. (42) Aug.

Commercial Alternator Design.* W. L. Waters. (42) Aug.

Electric Power in Mill and Factory.* Charles W. Startsman. (69) Serial beginning Oct.

Electric Shipbuilding Cranes at Kiel.* (12) Oct. 9.

On Single-Phase Repulsion Motors. William Cramp. (Paper read before the British Assoc. for the Advancement of Science.) (11) Oct. 9.

The Glasgow Municipal Telephone System. (26) Serial beginning Oct. 9.

The Bexley Electric Lighting and Tramway Undertaking.* (26) Oct. 9.

Experiments for Improving the Construction of Practical Standards for Electrical Measurements. (Report of Committee of the British Assoc. for the Advancement of Science.) (26) Serial beginning Oct. 9.

The Parallel Working of Alternators. B. Hopkinson. (Abstract of paper read before the British Assoc. for the Advancement of Science.) (26) Oct. 9.

Electric Light and Power Engineering.* (47) Serial beginning Oct. 10.

The First Transmission of Energy in Europe by Means of Triphase Currents.* Emile Guarini. (19) Oct. 17.

The Electric Light and Power Situation in St. Louis.* (27) Oct. 17.

The Co-Operative Telephone Company's System at Detroit, Mich.* (27) Oct. 17.

A Combined Street Railway and Lighting Plant at Muskegon, Mich.* (14) Oct. 17.

Practical Examples with the Calculator Board: Series I, Notes for Submarine Cable Staffs.* Edward Raymond-Barker. (26) Serial beginning Oct. 23.

Transmission of Hudson River Power.* (27) Serial beginning Oct. 24.

On the Mechanism of Electric Power Transmission. A. E. Kennelly. (27) Oct. 24.

The Stone Wireless Telegraph System. Louis Duncan. (27) Oct. 24.

Photometric Tests of the Nernst Lamp.* (27) Oct. 24.

Alternating Current Generators at Preston.* (11) Oct. 30; (12) Oct. 30; (26) Oct. 30; (57) Oct. 30.

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Steam Turbo-Electric Generating Plants. George Wilkinson. (Paper read before the Inst. of Elec. Engrs.) (47) Serial beginning Oct. 31; Abstract (26) Oct. 30.
An Improved Method of Testing Large Alternators under Full Load Conditions. B. A. Behrend. (27) Oct. 31.
Notes on Certain Three-Wire Systems.* Charles T. Mosman. (Paper read before the Ohio Elec. Light Assoc.) (27) Oct. 31.
Motors in an Elevator Factory and Machine Shop.* (27) Oct. 31.
Motor-Driven Machine Tools.* (25) Nov.
Electric Searchlights; Their Use Afloat and Ashore.* Frank C. Perkins. (10) Nov.
The Care of Switchboards.* Edwin W. Creed. (64) Nov.
Some Practical Points in the Design of Direct-Current Dynamo-Electric Machines.* Cecil P. Poole. (3) Nov.
Static Discharges in Electric Circuits. Percy H. Thomas. (3) Nov.
Factory Turbo-Generator and Electric Power Distributing Plant.* (27) Nov. 7.
Dublin Three-Phase Central Station.* (27) Nov. 7.
The Electrical Drive for Machine Tools. Robert Lozier. (27) Nov. 7.
The Steam Turbine Installation of the B. F. Goodrich Company.* (14) Nov. 7.
Appareil Électrique pour le Chargement des Cornues à Gaz: Système P. Sarrasin. (34) Oct.
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The Imperial German Navy.* Archibald S. Hurd. (10) Nov.
The Steamship of the Future, Greater Safety, Comfort, Size and Speed.* Stephen P. M. Tasker. (10) Nov.
Bassin de Radoub de la Compagnie des Chantiers Kawasaki, à Kobé (Japon).* (35) Oct.
Le Paquebot *Kaiser Wilhelm II*.* J. Bousquet. (33) Serial beginning Oct. 3.
Les Moteurs à Pétrole à Bord des Voiliers de Pêche. C. Birault. (33) Oct. 31.

Mechanical.

Mechanical Handling of Material.* George Frederick Zimmer, Assoc. M. Inst. C. E. (63) Vol. 153.
Design of Sheaves and Drums for Wire Rope. Samuel Diescher. (58) Sept.
High Grade Wire Rope. L. C. Moore. (58) Sept.
Timber Treating Plants.* W. W. Curtis. (4) Oct.
A Consideration of the Gaseous Fuel Problem. Henry G. Morris. (2) Oct.
Air Separation of Cement (Description of Apparatus).* W. Michaelis, Jr. (67) Oct.
The Industrial Haulage System.* Hrolf Wisby. (69) Oct.
Constructional Details and Costs of Recent Extensions (1900-1902), with Notes on Working Results, at the Tynemouth Gas Works, North Shields.* A. Clement Hovey. (Paper presented to the North of England Gas Mgrs. Assoc.) (66) Oct. 6.
The Eitle Retort-Charging Machines.* (66) Oct. 6.
Borsigs Works.* (11) Serial beginning Oct. 9.
On the Design and Testing of Centrifugal Fans for Induced Draught and Other Purposes. W. Gilbert, A. M. I. C. E. (Paper read before the Civil and Mech. Engrs. Soc.) (11) Oct. 9.
A Simplified Method of Gas Purification to Completely Recover Tar and Ammonia.* (66) Oct 13.
Manufacture and Uses of Carborundum. F. A. J. Fitzgerald. (Paper read before the Philadelphia Foundrymen's Assoc.) (20) Oct. 15.
Mechanical Road Vehicles. W. Worby Beaumont, M. Inst. C. E. (29) Serial beginning Oct. 16.
Hydraulic Coal Hoist at Glasgow Harbour.* (12) Oct. 16.
Wrightson's Patent Coal Shipper.* (57) Oct. 16.
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Commercial Wrought-Iron and Steel Pipe. Franklin Riffle, M. Am. Soc. C. E. (Abstract of Paper read before the Pacific Coast Gas Assoc.) (47) Oct. 17.
Developments in Automobile Construction. T. Clarkson. (Paper read before the British Assoc. for the Advancement of Science.) (47) Serial beginning Oct. 17.
Notes on the Construction of Inclined Retort Settings.* Archd. S. B. Little. (66) Serial beginning Oct. 20.
Modernizing a Large Foundry.* (20) Oct. 22.
Advantages of Steam Turbines for Textile Mills. Austin R. Dodge. (Paper read before the New England Cotton Mfrs. Assoc.) (13) Oct. 22.
Diagrams for Estimating Hydraulic Machinery. Frank B. Kleinhaus. (13) Oct. 22.
The Miller System of Mechanical Refrigeration.* (15) Oct. 23.
Kilroy's Stoking Indicator.* (26) Oct. 23.
A New Continuous Process for Making Ingot Moulds.* (11) Oct. 23.
The Newcomen Engine* Henry Davey. (Paper read before the Inst. of Mech. Engrs.) (11) Serial beginning Oct. 23; (12) Serial beginning Oct. 23; (22) Oct. 23.
The Reversibility of Thermodynamics. J. Swinburne. (Abstract of Paper read at the British Assoc. for the Advancement of Science.) (47) Oct. 24.
A New Geared Speed Changing Device.* (20) Oct. 29.

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*Illustrated.

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Rapid-Cutting Tool Steels. (11) Serial beginning Oct. 30; (12) Oct. 30.
Observations Upon the Sub-Aqueous Storage of Steam Coal. J. Macaulay. (12) Oct. 30.
Reverse Curves Rolling Mill.* (12) Oct. 30.
Steam Turbo-Electric Generating Plants. George Wilkinson. (Paper read before the Inst. of Elec. Engrs.) (47) Serial beginning Oct. 31; Abstract (26) Oct. 30.
Modern Cylindrical Grinding.* C. H. Norton. (Abstract of Paper read before the Cincinnati Metal Trades Assoc.) (47) Oct. 31.
Motors in an Elevator Factory and Machine Shop.* (27) Oct. 31.
The Foundry and Town of Trafford City, Pa.* (14) Oct. 31.
Works of the Marine Engine & Machine Company.* (14) Oct. 31.
The Central Heating Plants of Indianapolis. W. K. Eldridge. (Paper read before the Amer. Soc. of Mun. Impvts. (60) Nov.; Abstract (13) Nov. 5.
Motor-Driven Machine Tools.* (25) Nov.
Natural Gas in Steam Production.* W. R. Crane. (45) Nov.
A New Type of Air Compressor.* W. H. Booth. (45) Nov.
Electric Steam and Hydraulic Shears at German Steel Works.* Frank C. Perkins. (41) Nov.
Recent Developments in the Production of Water Gas.* A. Humboldt Sexton. (9) Nov.
Special Features in the Design of Locomotive Boilers and Fireboxes.* Chas. S. Lake. (9) Nov.
Superheated Steam for Steam Engines; With Special Reference to the McPhail & Simpson's System.* John Goodman, M. Inst. C. E. (10) Nov.
Fuel Losses in Steam Plants, and How to Determine Them. George H. Barrus. (10) Nov.
Oil-Fired Furnaces.* A. M. Bell, M. Inst. M. E. (10) Nov.
Notes on the Operation of Large Carburetted Water Gas Sets. W. Cullen Morris. (Paper read before the Amer. Gas Light Assoc.) (24) Nov. 2.
The American Tube & Stamping Company's Steel Plant at Bridgeport, Conn.* (20) Nov. 5.
Rapid Reduction in the Lathe as Compared with Forgings.* Frank B. Kleinhans. (13) Nov. 5.
The Plant of the Buckhorn Portland Cement Co.* Richard L. Humphrey. (13) Nov. 5.
The New Sturtevant Foundry and Some Details of Its Inter-Transportation System.* (13) Nov. 5; (14) Nov. 7; (20) Oct. 29.
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The Electrical Drive for Machine Tools. Robert Lozier. (27) Nov. 7.
Factory Turbo-Generator and Electric Power Distributing Plant.* (27) Nov. 7.
The Policy of Gas Enrichment (Illustrated by London Practice). Arthur Graham Glasgow. (Paper read before the Amer. Gas Light Assoc.) (24) Nov. 9; (66) Oct. 27.
Les Machines à Vapeur Surchauffée. Alfred Vanderstegen. (31) Vol. II, Part I.
Théorie Élémentaire des Turbines à Vapeur. A. Rateau. (37) Sept.
Mode de Transport et de Distribution de Force pour la Commande des Grues de Port Aperçu Comparatif. B. Lambert and Eug. François. (37) Sept.
Récherches sur la Transmission de la Chaleur dans les Appareils d'Evaporation à Multiple Effet.* M. Sekutowicz. (32) Sept.
Nouveau Gazogène à Flamme Renversée.* Jules Deschamps. (32) Sept.
Appareil Électrique pour le Chargement des Cornues à Gaz: Systeme P. Sarrasin. (34) Oct.
Appareil d'Éclairage à Alcool Dénaturé.* Edmond Brunet. (36) Oct. 10.
Étude du Dérapage des Automobiles. J. Résal. (33) Serial beginning Oct. 17.
La Manufacture de Draps de Villeneuvette (Hérault).* Francis Marre. (33) Oct. 31.

Metallurgical.

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Borsig's Works.* (11) Serial beginning Oct. 9.
The Effect of Flue Dust upon the Thermal Efficiency of Hot Blast Stoves.* B. H. Thwaite. (62) Oct. 15.
Kennedy Blast-Furnace Top.* Axel Sahlin. (62) Oct. 15.
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The Magnetic Concentration of Iron Ore in New Jersey.* (20) Oct. 22.
The Morse Apparatus for Gauging Temperatures of Heated Substances.* (20) Oct. 22.
Slimes Treatment on the Rand.* H. S. Denny. (16) Oct. 24.
The Colorimetric Estimation of Gold in Cyanide Solutions. Henry R. Cassel. (16) Oct. 31.
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Electrolytic Copper Refining. Wilder D. Bancroft. (Paper read before the Amer. Electrochemical Soc.) (45) Nov.
The American Tube & Stamping Company's Steel Plant at Bridgeport, Conn.* (20) Nov. 5.
Treatment of Finely Divided Iron Ore. Léonce Fabre. (Tr. from the French.) (19) Nov. 7.

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*Illustrated.

Metallurgical—(Continued).

An Examination of Various Methods for the Estimation of Ferrocyanides. J. E. Clennell. (16) Nov. 7.

Les Progrès de la Métallurgie, Celle du Fer Exceptée, en 1901 et 1902.* (34) Serial beginning Oct.

Installations Électrique des Hauts Fourneaux de la Société *Elba*.* (33) Oct. 24.

Les Hauts Fourneaux Schneider et Cie. de Cette.* Francis Marre. (36) Oct. 25.

Les Procédés Aluminothermiques.* Émile Dieudonné. (36) Oct. 25.

Military.

The Manufacture and Efficiency of Armour-piercing Projectiles.* David Carnegie, Assoc. M. Inst. C. E. (63) Vol. 153.

The Webley-Fosbery Automatic Revolver.* Frederick S. Foltz. (44) Nov.-Dec.

Mining.

Notes on Gold Dredging. Gilbert Winslow, Assoc. M. Inst. C. E. (63) Vol. 153.

Notes on Clapwell Colliery. Maurice Deacon, M. Inst. C. E. (Paper read before the Inst. of Min. Engrs.) (57) Oct. 9.

Prospecting Gold Dredge with Steel Hull.* (68) Oct. 10; (16) Nov. 7.

Electric Pumping Plant at Dortmund.* (26) Oct. 16.

Coal Mining in the Indian Territory—The Southwestern Field.* W. R. Crane. (16) Oct. 17.

A Portable Tank for Watering the Roadways in Mines. W. Galloway. (57) Oct. 23.

Hydraulic Mining on the Quesnelle. Wm. M. Brewer. (16) Oct. 31.

Diamond Drilling in West Africa.* J. N. Justice. (Paper read before the Inst. of Min. and Metal.) (45) Nov.

The Mechanical Equipment of the Kimberley Diamond Mines. Chas. V. Allen. (9) Nov.

Ore Quarrying in the Boundary District of British Columbia.* E. Jacobs. (9) Nov.

Miscellaneous.

The Folly of Reckoning by Gallons, Which Differ Widely in Canada and the United States, while All Countries Have Identical Liters and Cubic Meters. Frederick Brooks. (28) Sept.

Technical Education—What It Should be. Louis Duncan. (9) Nov.

Municipal.

Some Observations on Street Pavements. S. Whinery, M. Am. Soc. C. E. (13) Serial beginning Oct. 22.

Difficult Street Intersections.* (14) Oct. 24.

Revere Beach Reservation of the Metropolitan Park System, Boston. H. J. Kellaway. (14) Oct. 24.

Report of Committee on Park Improvements and Maintenance. G. A. Parker. (Report of Committee of Amer. Soc. of Mun. Impvts.) (60) Nov.

Pavements of Indianapolis.* J. B. Nelson. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.

Medina Sandstone Pavements in Brooklyn, N. Y. C. D. Pollock. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.

Pavements of Newark, N. J. E. Adam. Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.

The Construction of Warren's Bitulithic Pavement. C. A. Kenyon. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.

Wood Paving Specifications in Greater New York. F. A. Kummer. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.

The Development of the Kreodone Block Pavement. P. C. Reilly. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.

The Cost of Brick Pavements. Fred Giddings. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.

The Passing of the Cobblestone. Geo. W. Tillson. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.

Asphalt Pavements and Their Maintenance in Rochester, N. Y. W. J. Stewart. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.

Railroad.

Mountain Railways.* George Deuchars, M. Inst. C. E. (53) Vol. 153.

The Construction of the Mountain Section of the Cairns Railway, Queensland. George Alexander Hobler, Assoc. M. Inst. C. E. (63) Vol. 153.

Permissible Wheel-Load per Foot of Wheel Diameter, and per Inch of Breadth of Rail-Head. Francis Joseph Edward Spring, M. Inst. C. E. (63) Vol. 153.

The Storage Battery in Substations (on Interurban Roads).* W. E. Goldsborough and P. E. Fansler. (42) Aug.

Some Notes on the Operation of Railway Motors in Service.* Clarence Renshaw. (42) Aug.

Storage Battery Industrial Locomotives.* F. L. Sessions. (42) Aug.

Predetermination in Railway Work. F. W. Carter. (42) Aug.

Interurban Car Tests.* W. E. Goldsborough and P. E. Fansler. (42) Aug.

*Illustrated.

Railroad—(Continued).

Effect of Cylinder Clearance upon the Quantity of Steam Consumed in doing Specific Work, with Special Reference to Locomotive Practice.* Ira C. Hubbell. (65) Sept. 18.

The Proportions of Modern Locomotives. Lawford H. Fry. (65) Sept. 18.

Railway Maintenance-of-Way. H. J. Slifer. (4) Oct.

Railroad Reconnaissance.* Willard Beahan. (4) Oct.

Steel Frame Side-Door Suburban Cars of the Illinois Central R. R.* (39) Oct.

Consolidation Locomotives of the Northern Pacific Railway.* (39) Oct.

Electric Locomotive, Baltimore & Ohio Railroad.* (39) Oct.

Four-Wheel Caboose, Chicago, Burlington & Quincy Railway.* (39) Oct.

Timber Treating Plants (for ties).* W. W. Curtis. (4) Oct.

The Tie Problem: with Special Reference to Concrete Ties.* G. H. Kimball, M. Am. Soc. C. E. (4) Oct.

Reduction in Locomotive Fuel Consumption.* (Report of Committee of the Amer. Ry. Master Mechanics' Assoc.) (12) Oct. 9.

Recent Improvements in the Oregon Short Line R. R.* W. P. Hardesty. (13) Oct. 15.

The Brilliant Cut-Off of the Pennsylvania Railroad at Pittsburg.* (40) Oct. 16.

Pittsburg & Lake Erie Atlantic Locomotive.* (40) Oct. 16.

Steel Coal Cars for the Burlington.* (40) Oct 16 and Oct. 23; (18) Oct. 17 and Oct. 24.

The New York Terminal of the Pennsylvania R. R.* (15) Oct. 16.

Brunel and the 7-Ft. Gage.* Herbert T. Walker. (15) Oct. 16.

Steam and Electric Railway Crossings. Charles R. Barnes. (Paper read before the St. Ry. Assoc. of the State of N. Y.) (17) Oct. 17.

Power Transmission for Interurban Lines. J. B. Storer. (Paper read before the St. Ry. Assoc. of the State of N. Y.) (17) Oct. 17.

New German Single-Phase Railway System.* (17) Oct. 17.

Locomotive Boiler with Water-Tube Firebox.* (47) Oct. 17.

Tunnels for the New York City Terminus of the Pennsylvania and Long Island Railroads.* (14) Oct. 17; (13) Oct. 15.

General Track Work. A. Morrison. (Abstract of Paper read before the Roadmasters' and Maintenance of Way Assoc.) (18) Oct. 17.

Track Tools—Their Use and Abuse. J. C. Rockhold. (Abstract of Paper read before the Roadmasters' and Maintenance of Way Assoc.) (18) Oct. 17.

The New Canadian Transcontinental Railway.* (13) Oct. 22.

Track Notes on the Illinois Central. (40) Oct. 23.

Tandem Compound Express Locomotive—Russian Empire Railways.* (12) Oct. 23.

Class D^2 Mogul (2-6-0) Locomotive for the "Soo Line."* (15) Oct. 23.

Interurban Freight and Express.* (17) Oct. 24.

Roadbed Construction for World's Fair Intramural Railway.* (17) Oct. 24.

Construction of the Railroad Across Salt Lake.* (46) Oct. 24.

General Instructions to Locating Engineers; Issued by Wm. Ashton, Resident Engineer, Oregon Short Line R. R. (14) Serial beginning Oct. 24.

Improvement of Railway Terminal Facilities at St. Louis, Mo. (13) Oct. 29.

The Knox Steel Railroad Tie.* (20) Oct. 29.

The Proper Scope of Railway Standards and the Requirements Which They Should Fulfill. V. K. Hendricks. (40) Oct. 30.

Ten-Wheel Locomotive for the 'Frisco.* (40) Oct. 30.

Experiments with Stacks and Exhaust Pipes.* T. H. Symington. (Extracts from a paper presented before the Richmond R. R. Club.) (15) Oct. 30.

London and Brighton Railway Widening.* (11) Serial beginning Oct. 30.

Four-Cylinder Compound Locomotives. Alfred G. DeGlehn. (13) Oct. 30.

The Pennsylvania Railroad Tunnel under New York City.* (40) Oct. 30.

Improved Alloys for Car Bearings. (40) Oct. 30.

San Mateo Extension of the United Railroads of San Francisco.* (17) Oct. 31.

Twelve Hundred-Volt Direct-Current Railway in France.* (17) Oct. 31.

The New Union Railroad Station at Washington, D. C.* (14) Oct. 31.

Strength of Locomotive Steam Chests.* O. W. Bodler. (39) Nov.

Composite Gondola Cars of the Chicago, Burlington & Quincy Ry.* (39) Nov.

Mogul Locomotives for Japan, Kiushiu Railway.* (39) Nov.

Santa Fe Freight Locomotives, A. T. & S. F. Ry.* (39) Nov.

Special Features in the Design of Locomotive Boilers and Fireboxes.* Chas. S. Lake. (9) Nov.

New Locomotive and Car Shops, McKees Rocks, Pa., Pittsburgh & Lake Erie Railroad.* (25) Serial beginning Nov.

The Heaviest Locomotive Ever Built; Atchison, Topeka & Santa Fé Railway.* (25) Nov.

Locomotive Building in Germany.* A. von Borries. (10) Nov.

An Extensive Water Softening Installation, Pittsburgh & Lake Erie Railroad. (25) Serial beginning Nov.

Heavy Freight Locomotive, Lake Shore & Michigan Southern Railway; 2-8-0 Type.* (25) Nov.

New Passenger Locomotives, Pittsburg & Lake Erie Railroad, 4-4-2 Type.* (25) Nov.

New Freight House for the Baltimore & Ohio.* (40) Nov. 6.

The Farlow Draft Gear.* (15) Nov. 6.

Three-Position Signals vs. Separate Home and Distant. (Report of Committee of Ry. Signaling Club.) (15) Nov. 6; (18) Nov. 7; (40) Nov. 6.

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*Illustrated.

Railroad—(Continued).

Progress of Power Signaling in England. Charles H. Grinling, (15) Nov. 6.
Foundation Brake Gear for High-Pressure Control.* (Report of Committee of Ry. Signaling Club.) (15) Nov. 6.
The Conestoga Traction System.* (17) Nov. 7.
B. & O. R. R. Engine Terminal Improvements at Pittsburg. (18) Nov. 7.
Notes on Railway Location in Forest Country. Moses Burpee, M. Am. Soc. C. E. (14) Nov. 7.
Systeme Nouveau dit des Leviers d'Itinéraires pour la Commande à Distance des Aiguilles et Signaux de Chemins de Fer (Système Bleynie et Ducousso).* G. Bleynie. (38) Oct.
Le Chemin de Fer du Vésuve.* (38) Oct.

Railroad, Street.

High-Speed Electric Railway Problems. A. H. Armstrong. (42) Aug.
Some Recommendations Concerning Electrical and Mechanical Specifications of Trolley Insulators.* Samuel Sheldon and John D. Keiley. (42) Aug.
Track Construction and Maintenance. Thomas William Wilson. (Paper read before the St. Ry. Assoc. of the State of N. Y.) (17) Oct. 17.
Power Transmission for Interurban Lines. J. B. Storer. (Paper read before the St. Ry. Assoc. of the State of N. Y.) (17) Oct. 17.
Steam and Electric Railway Crossings. Charles R. Barnes. (Paper read before the St. Ry. Assoc. of the State of N. Y.) (17) Oct. 17.
Mekarski System of Compressed-Air Locomotives as Used on Suburban Lines in Paris.* (19) Oct. 17.
A Combined Street Railway and Lighting Plant at Muskegon, Mich.* (14) Oct. 17.
A New Method of Tunneling under Broadway, New York.* (14) Oct. 24.
Harlem River Tunnel of the Rapid Transit Subway.* (46) Oct. 31.
The Brooklyn Tunnel of the New York Rapid Transit Railroad. (14) Oct. 31.
New Sub-Station on the Portsmouth, Kittery & York Street Railway.* (17) Nov. 7.
Novel Convertible Car.* (17) Nov. 7.
The Construction of the East Boston Tunnel of the Boston Subway System.* Robert B. Farwell. (14) Serial beginning Nov. 7.
Un Métropolitain à Voies Glissantes.* G. Sautereau. (36) Oct. 10.

Sanitary.

A Sewage Disposal System for a Country Residence.* (70) Sept.
Plumbing in the Rapid Transit Railroad Stations, New York.* (70) Oct.
Regulations for Plumbing and Sewer Connections at the St. Louis Exposition. (70) Oct.
The Design of Works for the Bacterial Treatment of Sewage. Stuart H. Davies. (11) Oct. 9.
Rock Trench-Work, Boston, Mass. Frederick I. Winslow. (13) Oct. 22.
A British View of the Bacterial Treatment of Sewage. Samuel Rideal. (Abstract of Paper read before the International Congress of Hygiene.) (13) Oct. 22.
Sewage Disposal at Hebden Bridge.* (12) Oct. 23.
The Disposal of New York's Refuse.* (46) Oct. 24.
Baltimore's System of Garbage Disposal.* (46) Oct. 31.
Perviousness of Sewers. A. P. Folwell. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.; (14) Nov. 7.

Structural.

Timber Treating Plants.* W. W. Curtis. (4) Oct.
The Relative Strength of Wet and Dry Concrete. James W. Sussex. (From *The Technograph.*) (67) Oct.
Effect of Clay on the Strength of Concrete. J. J. Richey and B. H. Prater. (67) Oct.
Sound and Unsound Portland Cements. (67) Oct.
Borsig's Works.* (11) Serial beginning Oct. 9.
Effect of Wind on Roofs. Theodor Nielsen, M. Danish I. C. E. (11) Oct. 9.
Fireproof Construction; Does it Afford Added Fire Protection? Perez M. Stewart. (13) Oct. 15.
Concrete Reinforcement.* Julius Kahn, Assoc. M. Am. Soc. C. E. (40) Oct. 16; (14) Oct. 17; (13) Oct. 15; (15) Oct. 16.
Certain Vexatious and Fallacious Cement Tests now in Vogue. D. B. Butler. (Paper read before the Soc. of Engrs.) (12) Oct. 16.
Interlocking Metal Piling for Power House Foundations.* (14) Oct. 24.
Notes on the Microstructure of Steel. James E. Howard. (20) Oct. 29.
Testing Brittleness of Steel.* E. Z. Izod. (Paper read before the British Assoc. for the Advancement of Science.) (62) Oct. 29.
Fractures and Characteristics of Iron and Steel.* R. G. Griswold. (64) Nov.
The Microscope in Engineering; Its Widening Use in Studying the Structure of Metals.* J. L. Hall. (10) Nov.
The Plant of the Buckhorn Portland Cement Co.* Richard L. Humphrey. (13) Nov. 5.
A New Type of Reinforced Hollow Tile Wall Construction.* (13) Nov. 5.
The Pabst Hotel and Majestic Theater.* (14) Nov. 7.

*Illustrated.

Structural—(Continued).

Bronzes et Laitons Entrant dans la Confection de Diverses Pièces de Machines et de Robinetterie.* Ern. Roussel. (31) Vol. II, Part 1.
La Prévention des Accidents dans les Travaux du Bâtiment.* Paul Razous. (33) Oct. 8.

Topographical.

Topographical Surveying.* W. C. Bunnel. (4) Oct.
Recent Rapid Base-Line Measures, Precise Leveling, and Triangulation.* A. L. Baldwin. (2) Oct.
The Determination of the Longitude of Honolulu, 1555-1903. John F. Hayford, Assoc. M. Am. Soc. C. E. (13) Nov. 5.

Water Supply.

Recent Irrigation in the Punjab.* Sidney Preston, Assoc. M. Inst. C. E. (63) Vol. 158.
The Flow of Water in Long Pipes. George Maxwell Lawford, M. Inst. C. E. (63) Vol. 158.
The Irrigation-Weir across the Bhadar River, Kathiawar. John James Bourne Benson, Assoc. M. Inst. C. E. (63) Vol. 153.
Work done in the Orange River Colony Refugee Camps. Henry C. Trollope. (63) Vol. 158.
Water Works Statistics for the Year 1902, in Form Adopted by the New England Water Works Association; compiled by Charles W. Sherman. (28) Sept.
The Significance of Bacteriological Methods in Sanitary Water Analysis. C.-E. A. Winslow and C. P. Nibecker. (7) Sept.
History and Description of the Montreal Water Works.* George Janin. (28) Sept.
Service Boxes of the Montreal Water Works.* T. W. Lesage. (28) Sept.
The Lawrence Filter.* M. F. Collins. (28) Sept.
Conservation and Increase of Subterranean Water.* E. O. Mawson. (12) Oct. 9.
The Methods and Cost of Installing Meters at Cleveland. O. (13) Oct. 22.
Transmission of Hudson River Power.* (27) Serial beginning Oct. 24.
The Cheesman Dam and Other Works for the Water Supply of Denver, Colorado.* (14) Oct. 24.
The Indianapolis Water Company. F. A. W. Davis. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.
The Construction of the Sixty-Inch Reinforced Conduits of Newark, N. J.* Morris R. Sherrerd. (Paper read before the Amer. Soc. of Mun. Impvts.) (60) Nov.
Some Sources of Error in Water Treatment. H. Spencer Flynt. (9) Nov.
An Extensive Water-Softening Installation, Pittsburgh & Lake Erie Railroad. (25) Serial beginning Nov.
A Hollow Concrete-Steel Dam at Theresa, N. Y.* Ambursen & Sayles. (13) Nov. 5.
An English Water-Softening Plant. (14) Nov. 7.
A Small Open Sand Filter at Reading, Pa.* (14) Nov. 7.
Les Barrages d'Assyout et d'Assouan et le Système Général des Irrigations de l'Égypte.* G. Richou. (33) Serial beginning Oct. 10.

Waterways.

Measurements of the Underflow at the Narrows of the Rio Hondo and San Gabriel, California.* Charles S. Slichter. (14) Oct. 17.
Holding Power of Ballast in Timber Cribs. (14) Nov. 7.
Electrical Equipment of the Miami-Erie Canal.* Charles W. Ricker. (17) Nov. 7.
Construction par l'Air Comprimé de Nouvelles Cales Sèches, au Port de Kiel.* (33) Oct. 24.

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*Illustrated.

Vol. XXIX. DECEMBER, 1903. No. 10.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

December 2d, 1903.—The meeting was called to order at 8.40 P. M., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 93 members and 11 guests.

The minutes of the meetings of November 4th and 18th, 1903, were approved as printed in *Proceedings* for November, 1903.

A paper by S. Maximoff, Assoc. M. Am. Soc. C. E., entitled "A Desirable Method of Dredging Channels through River Bars," was presented by the Secretary, who also read a communication on the subject from Rudolph Hering, M. Am. Soc. C. E.

The paper was discussed verbally by Messrs. E. L. Corthell, A. W. Robinson, H. J. Howe, Edward P. North and D. E. Moran.

Ballots for membership were canvassed, and the following candidates elected:

As Members.

Thomas Walker Fowler, Melbourne, Victoria, Australia.
Hubert Edward Green, San Francisco, Cal.
William Storrs MacHarg, Chicago, Ill.
John McNeal, Jr., Easton, Pa.
Florian Gaie Ross, Pittsburg, Pa.
Reginald Heber Thomson, Seattle, Wash.
Charles Beatty Wilson, Tullahoma, Tenn.
Andrew Feaster Woolley, Mexico, Mexico.

As Associate Members.

Joseph Hookman Bowman, Tonalá, Chiapas, Mexico.
Edward Sylvester Brower, Brooklyn, N. Y.
Arthur Ira Campbell, Osceola, Ark.
William Eliot Hamlin, New York City.
Charles Warren Murray, Americus, Ga.
Julius Welch Pfau, South Schenectady, N. Y.
Edgar Maverick Smith, Chicago, Ill.
Sutton Van Pelt, Tidewater, Ala.
Samuel Daugherty Williams, Jr., Toledo, Ohio.
James Albert Woodruff, West Point, N. Y.
Henry Amerman Young, Fort Washington, Md.

The Secretary announced the transfer of the following candidates, by the Board of Direction, on December 1st, 1903, from the grade of Associate Member to the grade of Member:

As Members.

Frederick Albert Coleman, Belington, W. Va.
John Lyle Harrington, West New Brighton, N. Y.
Kingsley Leverich Martin, Brooklyn, N. Y.
Charles William Smith, New York City.
Bernard Matthew Wagner, Brooklyn, N. Y.
Irving Mason Wolverton, Mt. Vernon, Ohio.

The Secretary announced the election of the following candidates by the Board of Direction, on December 1st, 1903:

As JUNIORS.

SYLVANUS A BECKER, Connellsville, Pa.
JOHN HARRISON FOSS, Huelo, Maui, Hawaii.
JOHN BLAKE GORDON, Washington, D. C.
GUY SCOTT, Columbus, Ohio.
CHARLES WOOD SUTTON, Union, Ore.
HOWARD SHAY WILLIAMS, Boonton, N. J.
HENRY WRIGHT WOODCOCK, Brooklyn, N. Y.
TUCK CHING STRONG YEN, Shanghai, China.

Adjourned.

December 16th, 1903.—The meeting was called to order at 8.45 P. M., President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 107 members and 9 guests.

A paper, by Emile Low, M. Am. Soc. C. E., entitled "The Breakwater at Buffalo, New York," was presented by the Secretary, who also read communications on the subject from Messrs. G. H. Raymond, Thomas D. Pitts, William T. Lyle and George E. Fell.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

December 1st, 1903.—President Noble in the Chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Briggs, Buck, Craven, Croes, Davison, Osgood, Pegram, and Schneider.

The Secretary reported that the Committee appointed, on the recommendation of this Society, by the authorities of the St. Louis Exposition, 1904, to organize an International Congress of Engineering, had made every effort to secure the co-operation of the American Society of Mechanical Engineers, the American Institute of Mining Engineers, the American Institute of Electrical Engineers, the Society of Naval Architects and Marine Engineers, and the Society for the Promotion of Engineering Education, and of those Bureaus of the Department of War, and the Department of Commerce and Labor, in charge of Military Engineering; but as the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers declined to co-operate in the project, the Committee had decided to report its inability to organize the proposed Congress, and had so reported to the authorities of the Exposition.

The Committee on Publications, and the Secretary, were appointed as a Committee to prepare for the Convention of the Society on an International Basis.

Applications were considered and other routine business transacted.

Six candidates were transferred from the grade of Associate Member to that of Member, and eight candidates for admission were elected to the grade of Junior.*

Adjourned.

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* See pages 438 and 439.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, January 6, 1904.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, entitled "Theory of the Spherical Dome with a Homogeneous Surface, and of the Framed Dome; Also Notes on the Construction of Masonry and Metal Domes," by E. Schmitt, Assoc. M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings*.

ANNUAL MEETING.

The Fifty-first Annual Meeting will be held at the Society House, January 20th and 21st, 1904. The Business Meeting will be called to order at 10 o'clock on Wednesday morning. The annual reports will be read, officers for the ensuing year elected, and members of the Nominating Committee appointed. The proposed project for a Union Engineering Building, and the proposition to appoint a Special Committee on "Concrete and Steel-Concrete," will also be part of the order of business.

Arrangements for the excursions and entertainments have been placed in the hands of the following committee:

J. WALDO SMITH,
S. L. F. DEYO, CHAS. WARREN HUNT.

NOMINATING COMMITTEE.

The Constitution provides that at the Annual Meeting of each year, seven Corporate Members, not officers of the Society, one from each of the seven geographical districts, into which the Society is divided for this purpose, shall be appointed by the meeting to serve for two years.

The usual blank request for suggestions as to representatives of each district, for presentation to the meeting, has been mailed to Corporate Members.

ANNUAL CONVENTION, 1904.

The Thirty-sixth Annual Convention will be held at St. Louis, Mo., during the week beginning October 3d, 1904.

A Committee of the Board of Direction is now arranging a programme, with a view to making this Convention an International Meeting of Engineers, for the presentation and discussion of timely subjects of professional interest.

As the details of the arrangements are developed, they will be announced in *Proceedings*.

UNIVERSAL EXPOSITION, ST. LOUIS, 1904.

The Society has undertaken to provide for an Engineering Exhibit, and the establishment of Headquarters for visiting engineers, and the Board of Direction has appropriated sufficient funds to defray the necessary expense.

This matter is in the hands of the following Committee:

ROBERT MOORE, M. Am. Soc. C. E., St. Louis, Mo., *Chairman.*
EDWARD C. CARTER, M. Am. Soc. C. E., Chicago, Ill.
MORDECAI T. ENDICOTT, M. Am. Soc. C. E., Washington, D. C.
JAMES L. FRAZIER, " " Frankfort, Ind.
WILLIAM JACKSON, " " Boston, Mass.
EMIL KUICHLING, " " New York, N. Y.
JOHN F. WALLACE, " " Chicago, Ill.
H. J. PFEIFER, Assoc. M. Am. Soc. C. E., St. Louis, Mo., *Secretary.*

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

ACCESSIONS TO THE LIBRARY.

From November 11th to December 8th, 1903.

DONATIONS.*

MODERN LOCOMOTIVE PRACTICE.

A Treatise on the Design, Construction, and Working of Steam Locomotives. By C. E. Wolff, A. M. Inst. C. E. Cloth, 9 × 6 ins., 8 + 267 + 5 pp., illus. Manchester, The Scientific Publishing Company. 10 shillings, 6 pence, net.

In this book the first chapter contains a short discussion of the resistances to be overcome by the locomotive, and the chapters which follow are arranged in what appears to the author to be the natural order. Two chapters are devoted to the discussion of the different general types in use in Great Britain, and then follow ten chapters dealing with the different parts in detail. The design of link motions and of radial valve gears has been treated at considerable length, and a new method of working out accurately a link motion described. A similar method is adopted for the working out of Joy's valve gear, and a calculation given of the maximum value of the stresses in the connecting rod due to the inertia of this gear. All the drawings have been reproduced from actual working drawings. The Contents are: Introduction—Train Resistance; Types of Express Locomotives; Goods and Mineral Engines; The Locomotive as a Carriage; Boilers; Cylinders; Valve Motions; Radial and Single Eccentric Valve Gears; Connecting Rods; Crossheads and Slides; Crank Axles; Balancing; Wheels; Examples of Modern Locomotives; Slipping of Locomotives at High Speeds. There is an index of five pages.

IRRIGATION ENGINEERING.

By Herbert M. Wilson, M. Am. Soc. C. E. Fourth Edition. Revised and Enlarged. Cloth, 9 × 6 ins., 23 + 573 pp., illus. N. Y., John Wiley & Sons, 1903. $4.00.

The author states in the preface that since the issue of the second edition there have been few important developments in hydraulic engineering, consequently the present revision does not affect any portion of the book radically, though it has been sufficiently thorough to affect every portion more or less. There have been constructed recently a number of great storage dams, both of masonry and of loose rock, and important changes in existing structures have been made. These are noted in Part III, in which the greatest amount of textual change has been made. The chapter on subsurface water sources has been improved materially. The chapter on rainfall and run-off of streams has been brought up to date and extended. The Contents are: Precipitation, Runoff, and Stream Flow; Evaporation, Absorption, and Seepage; Alkali, Drainage, and Sedimentation; Quantity of Water Required; Flow and Measurement of Water in Open Channels; Sub-surface Water Sources and Sewage for Irrigation; Classes of Irrigation Works; Alignment, Slope, and Cross-Section; Headworks and Diversion Weirs; Scouring Sluices, Regulators, and Escapes; Falls and Drainage Works; Distributaries; Application of Water, and Pipe Irrigation; Location and Capacity of Reservoirs; Earth and Loose-Rock Dams; Masonry Dams, Wasteways and Outlet Sluices; Pumping, Tools and Maintenance; Tables. There is an index of thirty-three pages.

THE DESIGN OF STEEL MILL BUILDINGS AND THE CALCULATION OF STRESSES IN FRAMED STRUCTURES.

By Milo S. Ketchum, Assoc. M. Am. Soc. C. E. Cloth, 9 × 6 ins., 13 + 367 pp., illus. New York, The Engineering News Publishing Co., 1903. $4.00.

This book is intended to provide a short course in the calculation of stresses in framed structures, and give a brief discussion of mill-building construction. It is to supplement the elementary books on stresses, on one hand, and the more elaborate treatises on bridge design, on the other. While the book is concerned chiefly with mill buildings, much of the matter will apply equally well to all classes of steel-frame construction. Both the algebraic and graphic methods of calculating stresses are described and illustrated. In the discussion of mill-building construction, the aim has been to describe the methods of construction and the material used, together with a brief treatment of mill-building design, and the making of estimates of weight and cost. The Contents are: Dead Loads; Snow Loads; Wind Loads; Miscellaneous Loads; Graphic Statics; Stresses in Framed Structures; Stresses in Simple Roof Trusses;

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* Unless otherwise specified, books in this list have been donated to the Library by the Publishers.

Simple Beams; Moving Loads on Beams; Stresses in Bridge Trusses; Stresses in a Transverse Bent; Stresses in Portals; Stresses in Three-Hinged Arch; Stresses in Two-Hinged Arch; Combined and Eccentric Stresses; General Design; Framework; Corrugated Steel; Roof Coverings; Side Walls and Masonry Walls; Foundations; Floors; Windows and Skylights: Ventilators; Doors; Shop Drawings and Rules; Paints and Painting; Estimate of Weight and Cost; Miscellaneous Structures. There is an index of five pages.

FRICTION AND LUBRICATION.

A Hand-Book for Engineers, Mechanics, Superintendents and Managers. By William M. Davis. Cloth, 8 × 6 ins., 225 pp., illus. The Lubrication Publishing Co., Pittsburg, Pa., 1903. $2.00.

The author, for the past ten years, has been in a position to make a close study of lubrication, on many kinds of engines and machinery, under all sorts of conditions. In presenting this book to the notice of those who have to do with the use of lubricants, while he has not endeavored to exploit any new theories, he has kept in mind the fact that engineers, managers and mechanics are busy men, and, therefore, he has tried to present the matter in a plain, concise way that will be readily understood by readers and be of practical value in their every-day work. Some of the chapter headings are: Friction; Friction Losses; Theory of Lubrication; Testing of Oils; Cylinder and Valve Lubrication; Lubricating Appliances: Care of Sight Feed Lubricators; Cutting and Scoring of Cylinder Surfaces: Groaning of Pump and Engine Valves; Deposits of Sticky and Solid Substances in Steam Cylinders; Effects of Some Boiler Compounds on Cylinder Lubrication; Lubrication of Gas and Gasoline Engines; Oiling Devices; Grease; Bearings and Journals; Hot Bearings and their Treatment; Ball and Roller Bearings; Oil House Methods, Cost, etc. There is an index of nine pages.

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Cours d'Électricité. Théorique et Pratique. Par C. Sarazin. Deuxième Edition, Revue et Augmentée. Paris, E. Bernard & Cie, 1903.

Die Telegraphie ohne Draht. Von Augusto Righi und Bernhard Dessau. Braunschweig, Friedrich Vieweg und Sohn, 1903.

Gas-Engine Design. With an Introduction on Comprssed Air. By E. J. Stoddard. Parker & Burton, Detroit.

Acetylene: The Principles of its Generation and Use. A Practical Handbook on the Production, Purification, and Subsequent Treatment of Acetylene for the Development of Light, Heat and Power. By F. H. Leeds and W. J. Atkinson Butterfield. London, Charles Griffin and Company, 1903.

Hydraulics with Working Tables. By E. S. Bellasis, M. Inst. C. E. Rivingtons, London, 1903.

SUMMARY OF ACCESSIONS.

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MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(November 11th to December 8th, 1903.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings*, Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
(7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine*, New York City, 25c.
(10) *Cassier's Magazine*, New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News*, New York City, 15c.
(14) *The Engineering Record*, New York City, 12c.
(15) *Railroad Gazette*, New York City, 10c.
(16) *Engineering and Mining Journal*, New York City, 15c.
(17) *Street Railway Journal*, New York City, 35c.
(18) *Railway and Engineering Review*, Chicago, Ill., 10c.
(19) *Scientific American Supplement*, New York City, 10c.
(20) *Iron Age*, New York City, 10c.
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(22) *Iron and Coal Trades Review*, London, England, 25c.
(23) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal*, New York City, 10c.
(25) *American Engineer*, New York City, 20c.
(26) *Electrical Review*, London, England.
(27) *Electrical World and Engineer*, New York City, 10c.
(28) *Journal*, New England Water-Works Assoc., Boston, $1.
(29) *Journal*, Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
(31) *Annales de l' Assoc. des Ing. Sortis des École Spéciales de Gand*, Brussels, Belgium.
(32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
(33) *Le Génie Civil*, Paris, France.
(34) *Portefeuille Économique des Machines*, Paris, France.
(35) *Nouvelles Annales de la Construction*, Paris, France.
(36) *La Revue Technique*, Paris, France.
(37) *Revue de Mécanique*, Paris, France.
(38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
(39) *Railway Master Mechanic*, Chicago, Ill., 10c.
(40) *Railway Age*, Chicago, Ill., 10c.
(41) *Modern Machinery*, Chicago, Ill., 10c.
(42) *Transactions*, Am. Inst. Elec. Engrs., New York City, 50c.
(43) *Annales des Ponts et Chaussées*, Paris, France.
(44) *Journal*, Military Service Institution, Governor's Island, New York Harbor, 50c.
(45) *Mines and Minerals*, Scranton, Pa., 20c.
(46) *Scientific American*, New York City, 8c.
(47) *Mechanical Engineer*, Manchester, England.
(54) *Transactions*, Am. Soc. C. E., New York City, $5.
(55) *Transactions*, Am. Soc. M. E., New York City, $10.
(56) *Transactions*, Am. Inst. Min. Engrs., New York City, $5.
(57) *Colliery Guardian*, London, England.
(58) *Proceedings*, Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(59) *Transactions*, Mining Inst. of Scotland, London and Newcastle-upon-Tyne.
(60) *Municipal Engineering*, Indianapolis, Ind., 25c.
(61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburg, Pa.
(63) *Minutes of Proceedings*, Inst. C. E., London, England.
(64) *Power*, New York City, 20c.
(65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting*, London, England, 15c.
(67) *Cement and Engineering News*, Chicago, Ill., 25c.
(68) *Mining Journal*, London, England.
(69) *Mill Owners*, New York City, 10c.
(70) *Engineering Review*, New York City, 10c.
(71) *Journal*, Iron and Steel Inst., London, England.

LIST OF ARTICLES.

Bridge.

Concrete Bridge over the Big Muddy River, Illinois Central R. R.* H. W. Parkhurst, M. Am. Soc. C. E. (13) Nov. 12.
The Protection of Steel in Ballasted Floor Bridges.* (13) Nov. 12.
Armoured Concrete Foot-Bridge at Toulouse.* (12) Nov. 13.
Standard Short-Span Bridges on the Atchison, Topeka & Santa Fe Railway.* (14) Nov. 14.
A Comparison of the Requirements of Recent Railway Bridge Specifications. A. H. Heller. (13) Nov. 19.
An American Bridge Built of German Steel and Launched at a Shipyard.* P. S. Hildreth. (13) Nov. 19.
The Limits of Working Stress in Bridges. (12) Serial beginning Nov. 20.
Comparative Eye-Bar and Wire Cable Designs for a Highway Bridge over the Rhine at Cologne.* (15) Nov. 20.
The Ambridge Plant of the American Bridge Company.* (14) Serial beginning Nov. 21.
Ballasted Floors on the Atchison, Topeka & Santa Fe (bridge floors).* (40) Nov. 27.
The Coatesville Viaduct of the Pennsylvania Railroad.* (40) Nov. 27.
Eye-Bars or Cables for Manhattan Bridge. R. S. Buck. (15) Dec 4.
The Manhattan Bridge over the East River, New York.* (15) Dec. 4.
Erection of the Turtipar Bridge on Barges and Cantilever Falsework. (14) Dec. 5.
Le Pont Suspendu de Vernaison. sur le Rhône * Léon Griveaud. (35) Nov.
Ponts à Transbordeur.* G. Leinekugel Le Cocq. (33) Serial beginning Nov. 21.

Electrical.

The Heyland Induction Motor.* A. S. Langsdorf. (Paper read before the Engineers' Club of St. Louis.) (1) Sept.
The Electrical Equipment of a Gold Dredge.* Ralph L. Montagu. (42) Oct.
The Cathode Ray Alternating Current Wave Indicator.* Harris J. Ryan. (42) Oct.
The Factors Which Affect the Energy Losses in Armature Cores.* J. Walter Esterline and C. E. Reid. (42) Oct.
Central Station Economies. W. E. Goldsborough and P. E. Fansler.* (42) Oct.
The Legalized Standard of Electromotive Force. Henry S. Carhart. (42) Oct.
Magnetic Units and Other Subjects That Might Occupy Attention at the Next International Electrical Congress. A. E. Kennelly. (42) Oct.
Electric Motors for Centrifugal Pumps and Fans. Aug. J. Bowie, Jr. (42) Oct.
An Efficient High-Pressure Water-Power Transmission Plant.* George J. Henry, Jr., and Joseph N. Le Conte. (42) Oct.
The E C. A. Proposed Model Wiring Specification. (26) Nov. 6.
Single-Phase Motors for Traction. Giorgio Finzi. (26) Serial beginning Nov. 6.
Reversing Motors for Live Rollers.* (22) Nov. 6.
Recent Developments of the Metropolitan Electric Supply Co.'s Installations.* (26) Serial beginning Nov. 13.
On the Use of Capacities as Multipliers in Connection with Electrostatic Voltmeters on Alternating-Current Circuits. E. W. Marchant and G. W. Worrall. (Abstract of Paper read before the British Assoc. for the Advancement of Science.) (26) Nov. 13.
Notes on the Theory of Parallel Running of Synchronous Machinery. H. C. Leake. (26) Nov. 13.
An Unusual Form of Capillary Electrometer.* Emile Guarini. (19) Nov. 14.
Electric Pumping Plant for De Beers Consolidated Mines, Kimberley.* (26) Nov. 13; (47) Nov. 14.
Faure Type Accumulators. (19) Nov. 14.
Distribution of Current in Three Phase Systems.* F. Hardie Jeannin. (27) Nov. 14.
Calculation of the Apparent Inductance of Armature Coils.* C. C. Hawkins. (27) Serial beginning Nov 14.
The Relative Reliability of Wireless and Wire Telegraph Systems.* Reginald A. Fessenden. (27) Nov. 14.
New Generating Station of the Rochester Gas and Electric Company.* (27) Nov. 14.
The Design of Direct-Current Machinery.* Val. A. Fynn. (26) Serial beginning Nov. 20.
The Choice of Wattmeters. Paul MacGahan. (27) Nov. 21.
Transposition of Telephone Lines: Cross-Talk and Induction.* Frank F. Fowle. (Abstract of Paper read before the Assoc. of Ry. Telegraph Supts.) (27) Nov. 21.
Surveys for Electrolysis, and Their Results.* D. H. Maury. (24) Nov. 23.
The Greenhill Electricity Works, Oldham Corporation.* (26) Serial beginning Nov. 27.
The Edison Accumulator for Automobiles.* W. Hibbert, Assoc. M. Inst. E. E. (Paper read before the Inst. of Elec. Engrs.) (26) Serial beginning Nov. 27.
Electricity in Manufacturing Plants. Walter M. McFarland. (Abstract of Paper read before the Soc. of Naval Architects and Marine Engrs.) (14) Nov. 28.
Testing Alternators under Full Load Conditions.* W. L. Waters. (27) Nov. 28.
Wireless Fire Alarm Signalling Apparatus.* (27) Nov. 28.
Recent Progress Abroad in Wireless Telephony.* (27) Nov. 28.
Large Gas Engine Electrical Plant in Germany.* (27) Nov. 28.
The Murphy High Potential Interrupter.* A. Frederick Collins. (27) Nov. 28.

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* Illustrated.

Electrical (Continued).

Notes on Certain Three-Wire Systems.* Charles T. Mosman. (47) Nov. 28.
Box Electric Rock Drill.* (68) Nov. 28.
Some New Experiments in Syntonic Wireless Telegraphy in the Italian Navy. (19) Nov. 28.
A Central Electric Power Plant of the Coal-Mining Department of the Delaware, Lackawanna & Western Railroad Co., at Scranton.* H. M. Warren. (45) Dec.
Recent Developments in Niagara Power.* H. W. Buck. (10) Dec.
Electric Convection. J. Frank Meyer. (3) Dec.
Electric Equipment of Iron Works. (41) Dec.
Recent English Alternating Current Machines.* (17) Dec. 5; (27) Dec. 5.
Montreal, the Greatest Centre of Transmitted Power.* Alton D. Adams. (27) Serial beginning Dec. 5.
Methods of Signaling and Operating in Telephone Exchanges.* Kempster B. Miller and Charles S. Winston. (27) Serial beginning Dec. 5.
Telephone Transmitters.* Arthur V. Abbott. (27) Serial beginning Dec. 5.
Usine Hydro-Électrique d'Avignonnet sur le Drac (Isère). A. Dumas. (33) Nov. 14.
La Construction des Dynamos en Allemagne.* C. F. Guilbert. (36) Serial beginning Nov. 25.

Marine.

The Economy of Large Ships. A. W. Robinson, M. Can. Soc. C. E. (5) Vol. 16, Pt. 2.
The Stone-Lloyd System of Ship's Bulkhead Gear. (11) Nov. 6.
Oil-Motor Boat for the Uganda Railway Company.* (11) Nov. 6.
The Carena Dry-Dock, Argentine Republic.* (14) Nov. 14.
German Marine Boiler Construction. Frank C. Perkins. (19) Nov. 14.
The Submarine Boat Protector.* (12) Nov. 20.
The Boilers of the *Maine*. (Favorable report on Niclausse Water Tube Type. (20) Nov. 26.
Non-Corrosive Nickel-Steel Boiler Tubes. Albert Ladd Colby, M. Am. Soc. M. E. (Paper read before the Soc. of Naval Archts. and Marine Engrs.) (13) Nov. 26.
The Concrete Dry Dock at Kiel, Germany; Subaqueous Construction by Floating Pneumatic Caisson.* (13) Dec. 3.
Notes on Side-Launchings. Wm. G. Groesbeck. (Paper read before the Soc. of Naval Archts. and Marine Engrs.) (13) Dec. 3.

Mechanical.

The Cost of Open-Hearth Steel as Affected by Using Blast Furnace Gas in Gas Engines. Peter Eyermann. (Paper read before the Civ. Engineers' Club of Cleveland.) (1) Sept.; Abstract (22) Nov. 6.
Central Station Economies. W. E. Goldsborough and P. E. Fansler.* (42) Oct.
Anthracite Gas Producers for Power Purposes. (22) Serial beginning Oct. 30.
Reactions and Temperatures in By-Product Coke Ovens. (22) Oct. 30.
Centrifugal Fans. J. H. Kinealy. (70) Serial beginning Nov.
An Economizer Discussion. (Fuel Economizers for Power Stations.) Edwin B. Katte, A. H. Blackburn, Wm. Downs, R. D. Tomlinson and J. E. Moulthrop. (65) Nov. 1.
Enlargements and Improvements at the Stafford Corporation Gas-Works.* (66) Nov. 3.
A New Percussive Drill.* (22) Nov. 6.
Air Gas. (12) Nov. 6.
Circulation in Water-Tube Boilers.* (12) Nov. 6.
Hammers Used in Die-Forging. (11) Nov. 6.
Reversing Motors for Live Rollers.* (22) Nov. 6.
Steam and the Steam Engine. John Batey. (Abstract of Paper read before the Birmingham Assoc. of Mech. Engrs.) (22) Nov. 6.
Carbonizing Larger Charges of Coal. H. Ries. (62) Nov. 12.
Machine for Sinking Screw Piles.* (20) Nov. 12.
Dunlop's Self-Contained Self-Regulating Gas Plant.* (47) Nov. 14.
Pickling Castings. (47) Nov. 14.
Different Gases in Gas Engines. Alfred H. White. (Lecture delivered before the Amer. Gas Light Assoc.) (24) Nov. 16.
The Pitting Rust of Iron. W. H. Birchmore. (24) Nov. 16.
Central Station Heating. D. F. M'Gee. (Paper read before the Iowa State Elec. Light Assoc.) (24) Nov. 16.
The Economic Advantages of Working a Carburetted Water-Gas Plant in Conjunction with a Coal-Gas Plant. S. Carpenter. (Paper read before the Southern District Assoc. of Gas Engrs. and Mgrs.) (66) Nov. 17.
Twenty Ton Breakdown Crane.* (12) Nov. 20.
Pierson's "Suction" Gas-Producer.* (11) Nov. 20.
A New Feed-Water Regulator.* (12) Nov. 20.
Speeds and Gearing of Machine Tools.* P. V. Vernon. (Paper read before the Manchester Assoc. of Engrs.) (47) Nov. 21.
Requirements of Machine Tool Operation, with Special Reference to the Motor Drive.* Charles Day. (Abstract of Paper presented before the N. Y. Elec. Soc.) (18) Nov. 21.
The Ambridge Plant of the American Bridge Company.* (14) Serial beginning Nov. 21.

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Mechanical (Continued).

The Hot Water Meter for Evaporative Tests of Boilers.* John A. Drew. (14) Nov. 21; (20) Nov. 19; (70) Nov.
Flow of Gas in Long Pipes and under High Pressures. (60) Nov. 24.
The American Separately Fired Superheater.* (20) Nov. 26.
Motors Required to Drive Power Presses. (20) Nov. 26.
The Wagner Cold Sawing Machines.* (20) Nov. 26; (62) Nov. 26.
Seamless Steel Tanks Pressed from Plates.* (20) Nov. 26.
The Use of Compressed Air for Operating the Contractor's Plant at the Wachusett Dam.* (13) Nov. 26.
Non-Corrosive Nickel-Steel Boiler Tubes. Albert Ladd Colby. M. Am. Soc. M. E. (Paper read before the Soc. of Naval Archts. and Marine Engrs.) (13) Nov. 26; Abstract (20) Nov. 26; (40) Nov. 27.
Four-Stage Air Compressor for 850-Lbs. Pressure.* (13) Nov. 26.
An Apparatus for Measuring Gas Leakage.* Emile Guarini. (13) Nov. 26.
Band Brakes.* J. S. V. Bickford. (12) Nov. 27.
Notes on the Arrangement and Construction of Steam Pipes and Their Connections.* Robert C. Monteagle. (Paper read before the Soc. of Naval Archts. and Marine Engrs.) (13) Nov. 26.
Centrifugal Pumps.* Thomas E. Stanton. (Paper read before the Inst. of Mech. Engrs.) (11) Nov. 27.
The Hydraulic Plant for Drawing Steel Shells, at the Imperial Arsenal, Osaka, Japan.* Gompei Kuwada. (14) Nov. 28.
Superheated Steam.* F. J. Rowan. (Paper read before the Inst. of Engrs. and Shipbuilders in Scotland.) (47) Serial beginning Nov. 28.
The Science of Steam Generation.* F. J. Rowan, Assoc. M. Inst. C. E. (10) Dec.
Power for Large Machine Tools.* Charles H. Benjamin. (10) Dec.
Heavy Service Lathe.* (12) Nov. 27.
The Use of Fly Wheels upon Machine Tools. J. C. Steen. (25) Dec.
An Interesting Set of Screw Machine Tools.* W. E. Willis. (41) Dec.
A Quarter-Turn Rope Drive.* (41) Dec.
Universal Screw Machine, 2 Inches by 12 Inches.* (39) Dec.
Aerial Tramways. Stephen De Zomboria. (Paper read before the Amer. Min. Cong.) (45) Dec.
Coal Washing by the Stewart System.* David T. Blakey. (45) Dec.
Washing Montana Coal.* J. V. Schaefer. (45) Dec.
The Thwaite Blast Furnace Gas Cleaning Plant.* (20) Dec. 3.
The Tindel-Morris High Duty Cold Saw.* (20) Dec. 3.
The Westinghouse Blowing Engine.* (20) Dec. 3.
Steam Pipes and Their Connections.* Robert C. Monteagle. (Paper read before the Soc. of Naval Architects and Marine Engrs.) (20) Dec. 3.
Alcohol as a Motive Power. (From the Fr. of M. O. Boudouard, in *Revue de Chimie Industrielle.*) (19) Dec. 5.
A System of Handling Sand Mechanically for Cyanide Vats.* Charles Butters and Albert F. Crank. (Abstract of Paper read before the Inst. of Min. and Metal.) (16) Dec. 5.
The Lebaudy Airship.* (46) Dec. 5.
A Simple Superheater.* (17) Dec. 5.
A Gantry Crane with Double Cantilever Bridge.* (13) Dec. 3; (20) Dec. 3; (14) Dec. 5.
The Plant of the Northampton Portland Cement Company.* Richard K. Meade. (14) Dec. 5.
Concrete Tanks for Gasholders. (24) Dec. 7.
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Essai des Canalisations par la Fumée. (35) Serial beginning Nov.
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Nouveau Type de Machine à Vapeur. (36) Nov. 10.
Appareil Auto-Régulateur de Tirage des Foyers des Chaudières à Vapeur.* H. Noalhat. (36) Nov. 10.
Emploi Économique des Moteurs à Gaz Pauvre.* F. Gramyr. (36) Nov. 10.
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Machine pour le Travail des Hélices.* (33) Nov. 14.

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The Cost of Open-Hearth Steel As Affected by Using Blast Furnace Gas in Gas Engines. Peter Eyermann. (Paper read before the Civ. Engineers' Club of Cleveland.) (1) Sept.; Abstract (22) Nov. 6.
Use of Thermite in Gaining of Metals. B. Palmer Caldwell. (62) Nov. 12.
Preventing Pipes and Blow Holes in Ingots and Castings. F. C. Weber. (20) Nov. 12.
A Blast Furnace with Continuous Flow of Metal.* (20) Nov. 12.
A Brief Study of the Ferro Metals and Their Electrical Manufacture. Auguste J. Rossi. (20) Nov. 12.
Alumino-Thermics and Rail Welding.* Hans Goldschmidt. (17) Nov. 14.
Electrolytic Copper Refining. Wilder D. Bancroft. (Abstract of Paper read before the Amer. Electrochemical Soc.) (16) Nov. 14.

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Lead Smelting in Spain.* Hjalmar Eriksson. (16) Nov. 14.
Grinding Machines Used at Kalgoorlie. W. E. Simpson. (Abstract of Paper read before the Inst. of Min. and Metal.) (16) Nov. 14.
Manganese Ore as a Desulphurizing Agent in the Foundry. (20) Nov. 19.
The Analysis of High Speed Steels. (11) Nov. 20.
The Precipitation of Gold from Cyanide Solutions. W. A. Caldecott and E. H. Johnson. (16) Nov. 21.
Merton's Calcining Furnace.* F. Danvers Power. (16) Nov. 21.
Treatment of Telluride Ores by Dry-Crushing and Roasting, at Kalgoorlie, Western Australia.* W. Evan Simpson. (Paper read before the Inst. of Min. and Metal.) (68) Serial beginning Nov. 7; Abstract (16) Nov. 21.
Manufacture of Sound Casting by Means of Thermit. J. B. Nau. (62) Nov. 26.
Consumption of Zinc in Cyanide Plants. Walter H. Virgoe. (Abstract of Paper in the *Journal of the Chemical, Metal. and Min. Soc. of South Africa.*) (16) Nov. 28.
The Ferraris Ball Mill (an ore-crushing mill).* Walter Renton Ingalls. (16) Nov. 28.
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Slimes Process at the Consolidated Mercur Gold Mines.* George Moore. (16) Dec. 5.

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The Hydraulic Plant for Drawing Steel Shells, at the Imperial Arsenal, Osaka, Japan.* Gompei Kuwada. (14) Nov. 28.
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Essais sur la Stabilité des Poudres et des Divers Explosifs à Base de Nitrocellulose. (33) Nov. 21.

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Some Notes on Certain Underground Hoisting Problems on the Witwatersrand. A. W. K. Pierce. (42) Oct.
The Electrical Equipment of a Gold Dredge.* Ralph L. Montagu. (42) Oct.
Notes on Coal Cutting Machinery. A. Simon. (Paper read before the South Staffordshire and East Worcestershire Inst. of Min. Engrs.) (22) Oct. 30; (57) Nov. 6; (68) Nov. 7.
The Lindeman New Electric Safety Lamp with Chelin Accumulators.* (22) Nov. 13.
Electric Pumping Plant for De Beers Consolidated Mines, Kimberley.* (26) Nov. 13; (47) Nov. 14.
Hoisting Plant and Steel Shaft House for the Oliver Iron Mining Co., at Ely, Minn.* (13) Nov 19.
New Endless-Rope Haulage Plant at Tennessee Coal, Iron & Railroad Co. in Alabama. Erskine Ramsay. (45) Dec.
Coal Washing by the Stewart System.* David T. Blakey. (45) Dec.
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Lining Shafts with Concrete and Expanded Metal (shafts in mines).* (45) Dec.
Aerial Tramways. Stephen De Zomboria. (Paper read before the Amer. Min. Cong.) (45) Dec.

Railroad.

The Construction of the Great Northern Railway of Canada, 1899-1900.* J. M. Shanly, M. Can. Soc. C. E. (5) Vol. 16, Pt. 1.
Competition of Steam *vs.* Electric Parallels. C. H. Davis, M. Can. Soc. C. E. (5) Vol. 16, Pt. 1.
Concerning Leaky Fireboxes. T. S. Reilly. (61) Oct. 20.
Specifications for Boiler Tubes. (61) Oct. 20.
New Carriage Bogie: Great Western Railway.* (21) Nov.
Electricity in Railway Signalling. (21) Serial beginning Nov.
30-ton Private Owners' Wagons. (Drawings and Specification by James Holden, M. Inst. C. E.) (21) Nov.
1st and 3rd Class Composite Dining Carriage: Great Northern Railway.* (21) Nov.
Some Notes on Acceleration—Electric *v.* Steam. P. Walter d'Alton, M. Inst. C. E., and John Mannheim. (12) Nov. 6.
Heavy Goods Engine for the Bengal Nagpur Railway.* (12) Nov. 6.
The Use of Three-Position, Separate Home and Distant and Overlapping Automatic Block Signals. (Report of Committee of the Ry. Signal Club.) (13) Nov. 12.
Drop-Bottom, Flat-Floor Gondola Cars for the Chicago, Burlington & Quincy Ry.* (13) Nov. 12.
The Use of Distant Signals at Interlocking Plants. (Report of Committee of the Ry. Signal Club.) (13) Nov. 12.
Fish Car for the Great Central Railway of England.* (40) Nov. 13.
Two-Cylinder Compound Locomotives for the Wabash.* (40) Nov. 13.
Signal Circuits.* (Report of a committee to the Ry. Signal Assoc.) (18) Nov. 21; (40) Nov. 13.
Automatic Signals for Single Track. (Report of a committee to the Ry. Signal Assoc.) (18) Nov. 21; (40) Nov. 13.
Tandem-Compound Consolidations for the Colorado & Southern.* (15) Nov. 13.
Notes from the Middletown Shops of the New York, Ontario & Western.* (15) Nov. 13.

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Electrically-Operated Roundhouse Turntables.* Frank C. Perkins. (15) Nov. 18.
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Recent Progress in the Design of Locomotive Front-Ends. W. F. M. Goss, M. Am. Soc. M. E. (Extract from Paper read before the Central R. R. Club.) (13) Nov. 19; (15) Nov. 18.
The Railway Tie Question. (From report of the proceedings of the annual convention of the Roadmasters' and Maintenance of Way Assoc.) (13) Nov. 19.
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Some Experiments with Stacks and Exhaust Pipes.* T. H. Symington. (Abstract of Paper presented before the Richmond Ry. Club.) (18) Nov. 28; (47) Nov. 28.
The Essentials of a Modern Railway Paint Shop. (Abstract of Paper presented before the Ry. Club of Pittsburg.) (18) Nov. 28.
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The Vienna Metropolitan Railway.* Emile Guarini. (19) Serial beginning Nov. 28.
Multi-Cylinder Locomotives.* J. F. Gairns. (10) Serial beginning Dec.
Special Features in the Design of Locomotive Boilers and Fireboxes.* Chas. S. Lake. (9) Dec.
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New Passenger Locomotive: Wabash Railroad: 4-4-0 Type.* (25) Dec.
Heavy Freight Locomotive: Lake Shore & Michigan Southern Railway: 2-8-0 Type.* (25) Dec.
Powerful Passenger Locomotive: 4-6-2 (Pacific) Type: Atchison, Topeka & Santa Fe Railroad.* (25) Dec.
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Hydraulic Drop Table.* (25) Dec.
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Melting Sleet on a Third Rail. W. A. Del Mar. (27) Nov. 21.
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Sewage Disposal. Chas. H. Rust, M. Can. Soc. C. E. (5) Vol. 16, Pt. 2.
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Heating a Country Residence by a Steam Boiler and a Warm Air Furnace.* (70) Nov.
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Data and Notes Derived from Tests on Cement and also on Concrete Taken from Regular Batches Used in Actual Works.* James S. Costigan, A. M. Can. Soc. C. E. (5) Vol. 16, Pt. 1.
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A New Method of Obtaining the Tensile Strength of Cement.* Arthur U. Johnson. (14) Nov. 14.
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Covering an Old Reservoir at Brookline, Mass. F. I. Winslow. (13) Nov. 12.

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Raising Water by Compressed Air.* William H. Maxwell, Assoc. M. Inst. C. E. (Paper read before the British Assoc. of Water-Works Engrs.) (11) Nov. 18.

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Southern California Mountain Water Company's Reservoirs, Dams and Pipe Lines.* (14) Nov. 14.

Present Types of Steam Turbines. A. R. Dodge. (Abstract of Paper read before the N. E. Cotton Mfrs. Assoc.) (18) Nov. 14.

Tangential Waterwheel Efficiencies: Being an Experimental Investigation of the Relative Values of Different Bucket Shapes.* George J. Henry, Jr., M. A. S. M. E. (Paper read before the Pacific Coast Elec. Transmission Assoc.) (19) Serial beginning Nov. 14.

The Production and Uses of Ozone.* (12) Nov. 20.

The Water Supply of the Lackawanna Steel Works.* (14) Nov. 21.

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A New Disk Water Meter.* Freeman Weston Hood and Henry R. Worthington. (14) Dec. 5.

Montreal, the Greatest Centre of Transmitted Power.* Alton D. Adams. (27) Serial beginning Dec. 5.

The Cedar Grove Reservoir of the Newark, N. J., Waterworks.* (14) Serial beginning Dec. 5.

Les Puits Filtrants et Leur Application aux Grands Débits Permanents.* Th. Verstraeten. (31) 8e Série, Tome II.

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